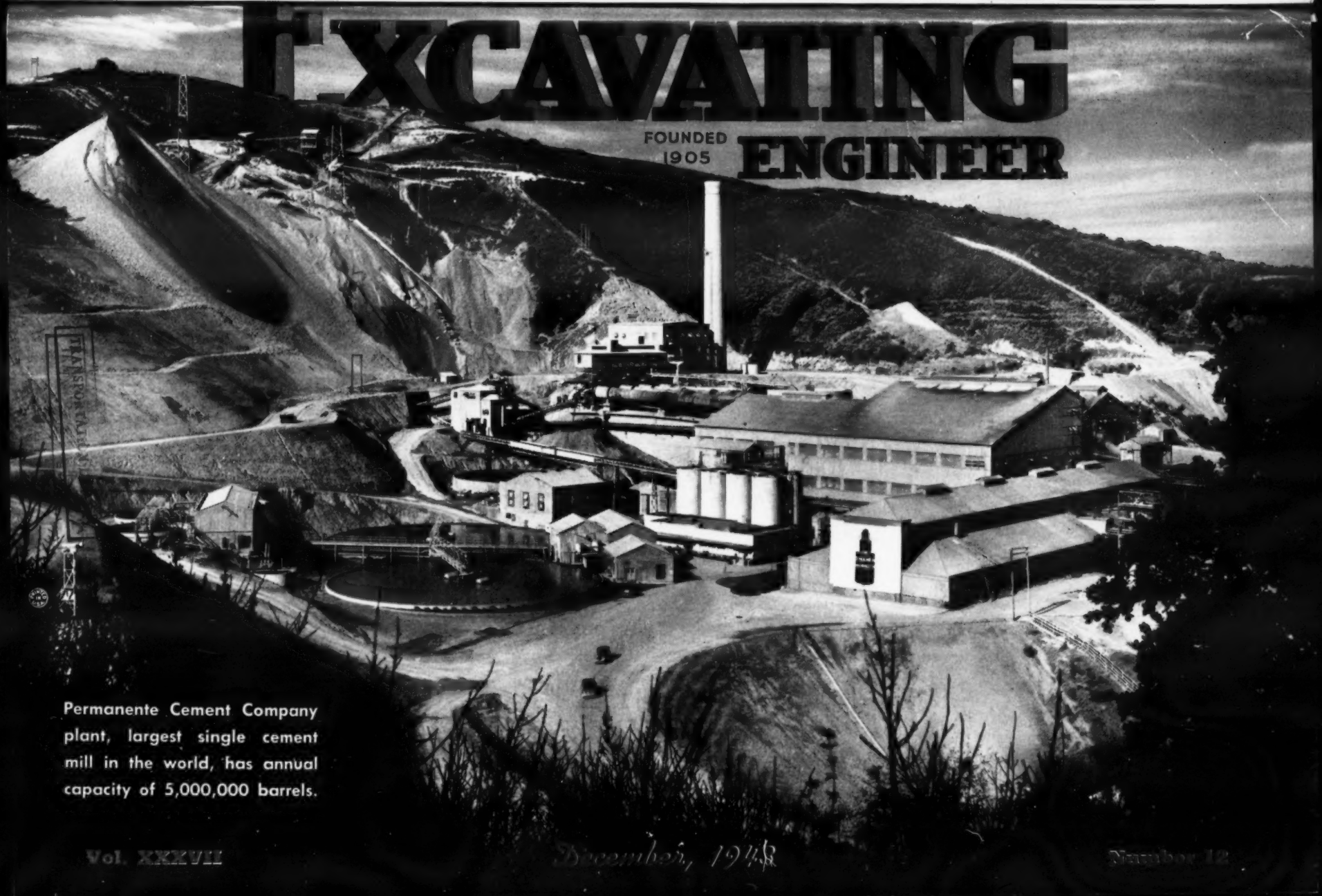
EXCAVATING ENGINEER

FOUNDED 1905



Permanente Cement Company plant, largest single cement mill in the world, has annual capacity of 5,000,000 barrels.

Vol. XXXVII December, 1948 Number 12

Keep Your Lubricants *Clean!*

Dirt and grit and similar abrasives which are allowed to creep into the lubricant to grind and damage your equipment, are Fifth Columnists.

They are often the causes of failures for which something else is unjustly blamed. Guard your vitally important excavator against such **preventable** operating interruptions. Keep it working for victory.

THESE SIMPLE PRECAUTIONS WILL INSURE CLEAN LUBRICANTS:

1. Be sure oil and grease comes to you clean.
2. Keep lubricants covered and stored neatly in a clean place.
3. Drain oil enclosures when hot so the draining oil carries off the sludge.
4. Keep funnels, plugs and oil spouts clean. Wipe off oil can covers before removing.
5. Keep empty containers that are to be refilled clean and tightly covered.
6. Clean enclosure covers before removing for inspection.
7. Clean outside of grease gun before using.
8. Clean fittings so that grit is not forced in with grease.
9. Be sure gun is thoroughly cleaned before changing type of grease.
10. Keep your machine clean always.

Bucyrus-Eries are the finest excavators that modern engineering can build. Good lubrication regularly, carefully and cleanly applied will protect their easy, smooth, high speed operation in the vital tasks they are performing in winning the war.

V-21

ARMY E NAVY

Bucyrus-Erie

SOUTH MILWAUKEE, WISCONSIN, U. S. A.

No this isn't a secret type of anti-aircraft gun. It is an FM-2 wagon-mounted rock drill designed especially for deep hole drilling. It is unusually flexible, can be moved from hole to hole quickly and can be set up so as to drill holes at any angle.

War could not be waged without rock drills, since they help mine essential ores, build landing fields for planes, construct strategic highways and help build giant hydroelectric projects to supply the power that keeps our war production machines rolling at an ever increasing tempo.

Today rock drills are helping us win the fight for freedom. Tomorrow when peace arrives, they will be just as useful in rebuilding the war-torn nations of the world.

If you have a problem which requires deep hole drilling, the I-R engineering service division nearest you can supply full details. And our engineers can also show you how Jackbits will speed up your job.

Ingersoll-Rand

11 BROADWAY, NEW YORK 4, N. Y.

5-367

COMPRESSORS • TURBO BLOWERS • ROCK DRILLS • AIR TOOLS • OIL AND GAS ENGINES • CONDENSERS • CENTRIFUGAL PUMPS

Alaskan Proving Ground — for POST-WAR

Shaping a shoulder on a stretch of the Alaska Highway. The International TD-18, with 8-yard scraper, is operated by Leo C. DuChamp, Thief River Falls, Minn.

Right Now It's a Mighty Military Road that INTERNATIONAL TracTracTors Helped Build

IF EVER a highway earned the right to be called a proving ground, the Alaska Highway has done so. Only the toughest road-building equipment got the call when construction began. Only the toughest equipment stayed on the job through the gruelling months that followed. Tractors and trucks, scrapers and graders, and the men who ran the show, made road-building history on this great construction job. Here was a proving ground dedicated to Victory, destined to influence post-war construction and REconstruction.

The Alaska Highway is a mighty military road now, a road that International TracTracTors helped build. This assignment is only one of many that these powerful crawlers are taking in their stride. Tens of thousands of war-geared Internationals serve in all branches of the Armed Services . . . as prime movers of big guns, smoothers of bomb-torn landing fields, clearers of jungle.

When it's time to carry on beyond Victory, Internationals will be readier than ever to tackle the toughest jobs of peacetime. Count on International Power then . . . to help *rebuild* the world.

INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue — Chicago 1, Illinois

INTERNATIONAL POWER

EXCAVATING ENGINEER

FOUNDED 1905

contents

Vol. XXXVII **December, 1943** No. 12

December Advertisers

Allied Steel Products....616 & 626
Allis-Chalmers Mfg. Co..... 609
American Chain & Cable Company, Inc. .....3rd Cover
Baker Manufacturing Co., The 613
Barber-Greene Company 585
Buckeye Traction Ditcher Co... 627
Bucyrus-Erie Company ...2nd Cover 582, 583, 608, 626 and 629
Buda Co., The 621
Caterpillar Tractor Co..... 605
Detroit Diesel Engine Div..... 584
Ensign-Bickford Company, The 581
Euclid Road Machinery Co., The 623
For Sale (Classified) 631-632
General Motors Corporation... 584
Haiss Manufacturing Company, George .....Fourth Cover
Hayward Company, The 616
Ingersoll-Rand Company 577
International Harvester Co.... 578
Jahn Co., C. R..... 628
Koehring Company 586
La Crosse Trailer and Equipment Co. 616
Leschen & Sons Rope Co., A... 630
LeTourneau, R. G., Inc..... 607
Linn Manufacturing Corp., The 614
Macwhyte Company 580
Northwestern Engineering Company 611
Onan & Sons, D. W..... 612
Owen Bucket Company, The.. 608
Rogers Brothers Corporation... 618
Sauerman Brothers, Inc..... 612
Standard Oil Company of California 587
Templeton-Kenly & Co..... 610
Union Wire Rope Corporation.. 615
U. S. Treasury Dept.—War Bonds 617
Ward LaFrance Truck Div..... 619
Wellman Engineering Co., The. 622

World's Largest Cement Plant 588

Bucyrus-Erie 5-cu. yd. and Marion 2½-cu. yd shovels dig limestone from mountain quarries to feed the Permanente Cement Company plant in the hills of the San Francisco peninsula. Entire process, from raw material to finished cement, is integrated within a short radius and flow of all materials from quarry to storage silos is down hill.

Post-war Highway Planning III 593

The post-war highway planning situation in Arizona, Delaware, Georgia, Maine, Massachusetts, Missouri, Montana, Nevada, South Dakota, and Wyoming is given in this third of a series of articles on the subject.

WPB Census of Construction-Type Equipment in the U.S.A. 596

Inventory made by the Construction Machinery Division of WPB from Regional Offices reports gives estimate of number and age of various units in U.S.A.

Equipment You Ought to Know About 599

Dozershovel 599
Euclid Loader 599
Oil Reclaimer 599
Drum Opening Tools 618
New "Level-Lift" Sling.... 618
Heil Bottom-Dump Trailer Wagon 618
Engine Heater 618

Oil from the Sands of Canada 600

Open pit methods used to mine fabulously rich McMurray oil sands in Alberta, Canada, may become greatest excavation project on the continent. Sands estimated to contain 250 billion barrels of oil, cover an area from 10,000 to 30,000 square miles.

Ancestors 602

Century-old English patents for excavators and pile drivers employ methods used on some modern machines of these types.

Shots from the Firing Line 606

Ten Per Cent Decline in Construction Volume .. 606
Allowed Use of MRO Symbol 606
Five Companies Develop New Alabama Bauxite 606
Southwest Cities Plan Post-war Airports 608
WPB Order Standardizes Jack Sizes and Models.. 610
Dredge Los Angeles Opens Bay to Deep Water Shipping 610
Fayal No. 2 Pit to be in Production in 1944.... 610
Bay State Plans 200 Million Post-war Program.. 610
September Portland Cement Production Declines 612
Another Generator Goes into Action at Grand Coulee 612
Remove Restrictions on California Oil Wells 614
Plan Construction of New Oil Pipeline 614
Coal Mining Safety Council Officers 614
Project Billions in Waterway Developments 614
Stefan Speaker at Pennsylvania Meeting 616
Mexican Highways Being Improved 616
Bus Line Air-minded..... 616

Obituaries 616

Lion Gardiner 616
Lt. Col. Morrison 616

Not in the Contract 617

Notes from the Manufacturer 630

New Trade Literature 632

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9 Factors Affecting the Life of Wire Rope (Continued)

{This is number 18 in a series of articles prepared by Macwhyte Wire Rope Company for the benefit of wire rope users everywhere. All articles in this series are yours for the asking. Macwhyte Engineering Experience is available on specific problems.}

★ ★ ★

In the previous article of this series, the first four of nine factors affecting wire rope life or service were discussed. They were:

1. Abrasion or Wear
2. Bending or Flexing
3. Tension or Stress
4. Speed

As the article pointed out, these four can be kept from doing too much harm (to rope and machine) by frequent checkups.

While some of the four factors mentioned above are normal and to be expected, there are five other "rope saboteurs" which are *not* normal. These can be corrected. They are:

5. Crushing or Mashing
6. Weathering or Corrosion
7. Jerking or Shock
8. Vibration
9. Heat or Friction

What can you do to correct them, and thus save steel and time now so urgently needed? Here are specific suggestions.

Crushing or Mashing

Improper winding (criss-crossing) on the sheaves or drums results in crushing or mashing. It *pays* to start the rope winding properly. Keep it from criss-crossing and reduce scuffing against the flanges of the drum and against the under layer to a minimum.

Where rope is loose on the ground (on incline slopes especially) it pays to prevent trucks or equipment from running over the rope. Lubricate rollers, sheaves, and guides so as to avoid undue abrasion. When rope jumps a sheave, stop and replace it before continuing the operation.

Permanent injury to the rope and damage to equipment can result if a rope is operated while out of its proper sheaves. In clamping or fastening the end of the rope use care to avoid needless damage.

Weathering or Corrosion

Wire rope is made of high carbon steel wire and will rust and corrode if not properly protected by a suitable lubricant, especially if it is not in constant use. Proper lubrication keeps the rope flexible and reduces wear as well as affording a protection against corrosion. (See article 10 in this series.)

Jerking or Shock

If there is slack in a rope, take it up slowly before the load is applied. This is where the human element enters the picture. Many a rope is ruined for lack of care on the part of the operator. A quick pickup with as little as 12 inches of slack will more than double the load on the rope and may cause it to snap. Even if the rope doesn't break immediately, it is weakened and breaks later in normal operation. (See article 15.)

Vibration

Vibration of wire rope in service fatigues the steel wires and consequently "tires" them out before they wear out. It is difficult to correct this except where this vibration is caused by faulty equipment and hurried handling. A clutch or brake may chatter and this vibration is multiplied many times throughout the length of the rope. Vibration may cause rope to break where it is dead ended (fastened). Where wire rope is fastened in a socket, continuous vibration will cause the wires to break right at the socket—cutting off a short section and refastening is a cure for this. A smooth pickup and steady operation will do much to eliminate vibration.

Heat or Friction

Heat changes the structure of steel. In general, it hardens it or makes it more brittle. Friction creates heat. Lubrication helps reduce friction. A stuck roller, a poorly aligned sheave, scuffing against wraps of rope on a drum, scraping on rock or metal creates friction and heat. Wire rope must be kept free to do its job of bending. Heat and friction will change its steel composition and cause it to break up prematurely. Where ropes travel at high speed, watch out for the effects of heat.

Not EVERY Enemy is found on the battlefront. Look . . .

Killed through Carelessness. Literally chewed to death, this rope was ruined before showing any normal wear.

Unnecessary Abrasion. A hoist rope was allowed to saw through a heavy plate. Such waste can and should be avoided.

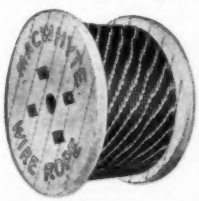
Mashed to Death. Criss-crossed on the drum, this rope gave only a fraction of the service it might have, had more care been used in spooling.

Why Such Waste? This rope has been cutting a number of grooves in the bucket rim. It will give poor service and increase operating costs.

Your Wire Rope Requirements

The benefit of years of experience based upon servicing equipment similar to yours is gladly given. When you ask Macwhyte for suggestions and recommendations, you can be assured not only of getting "The Correct Rope for Your Equipment," but also a personal interest in helping *you* get the most out of *your* rope.

Feel free to consult with Macwhyte distributors, Mill Depots representatives, or write to Macwhyte Company direct.



MONARCH WHYTE STRAND
PRE-FORMED WIRE ROPE
... Macwhyte's best grade wire rope, famous for its strength, toughness, preforming, and internal lubrication.

MACWHYTE COMPANY

ARMY E NAVY

WIRE ROPE MANUFACTURERS

2903 FOURTEENTH AVENUE KENOSHA, WISCONSIN

Mill Depots: New York · Pittsburgh · Chicago · Fort Worth · Portland · Seattle · San Francisco. Distributors throughout the U.S.A.

MACWHYTE PREformed and Internally Lubricated Wire Rope
MONARCH WHYTE STRAND Wire Rope
MACWHYTE Special Traction Elevator Rope
MACWHYTE Braided Wire Rope Slings
MACWHYTE Aircraft Cables and Tie-Rods

Victory begins *Underground*

YES, the underground of which you are a part, Igor and Petrov, has played a vital part in disrupting the plans of the Nazi Supermen in Occupied Russia.

The Red Army, strengthened by American-made tanks, guns and planes, is slowly crushing the ruthless invader back . . . back past the Dnieper River Valley where you were once free men. Other Allied Nations are crowding your captors from the East, South and West.

Over here skilled men are engaged in another underground activity—that of blasting out the coal and ore and stone that go to make up the fighting equipment of the Allied Nations. We make the Ensign-Bickford Safety Fuse and Primacord-Bickford Detonating Fuse *so essential to essential blasting.*

Victory Begins Underground.

L-P

THE ENSIGN-BICKFORD CO.
SIMSBURY, CONNECTICUT

Primacord-Bickford
Detonating Fuse

Announcing the NEW Bucyrus-e

HERE'S a completely new and different tractor equipment unit — the DOZERSHOVEL,* for T9 and TD9 International TracTracTors. Large numbers of these new Dozershovels have already been tested in tough military service. The bulk of our production must still go to our armed forces but a limited number are available now for civilian use under proper government release.

You'll like the DOZERSHOVEL because it's what you've always wanted in an all-round, economical dirt mover. ***Not*** just another front-end shovel, this versatile unit is interchangeable from shovel to dozer in just a few minutes. It features up to 4200 pounds of down pressure on either the bucket lip or the dozer blade for real penetration in digging. Unobstructed visibility lets the operator see what he's doing at all times, increasing the DOZERSHOVEL'S already high maneuverability and speed. These are just two of the many features that make this unit a real profit-maker. Look over the illustrations on these pages. They will convince you that the Bucyrus-Erie DOZERSHOVEL can make money for you. See your International TracTracTor Distributor for details.

*Trade mark registered U. S. Patent Office.

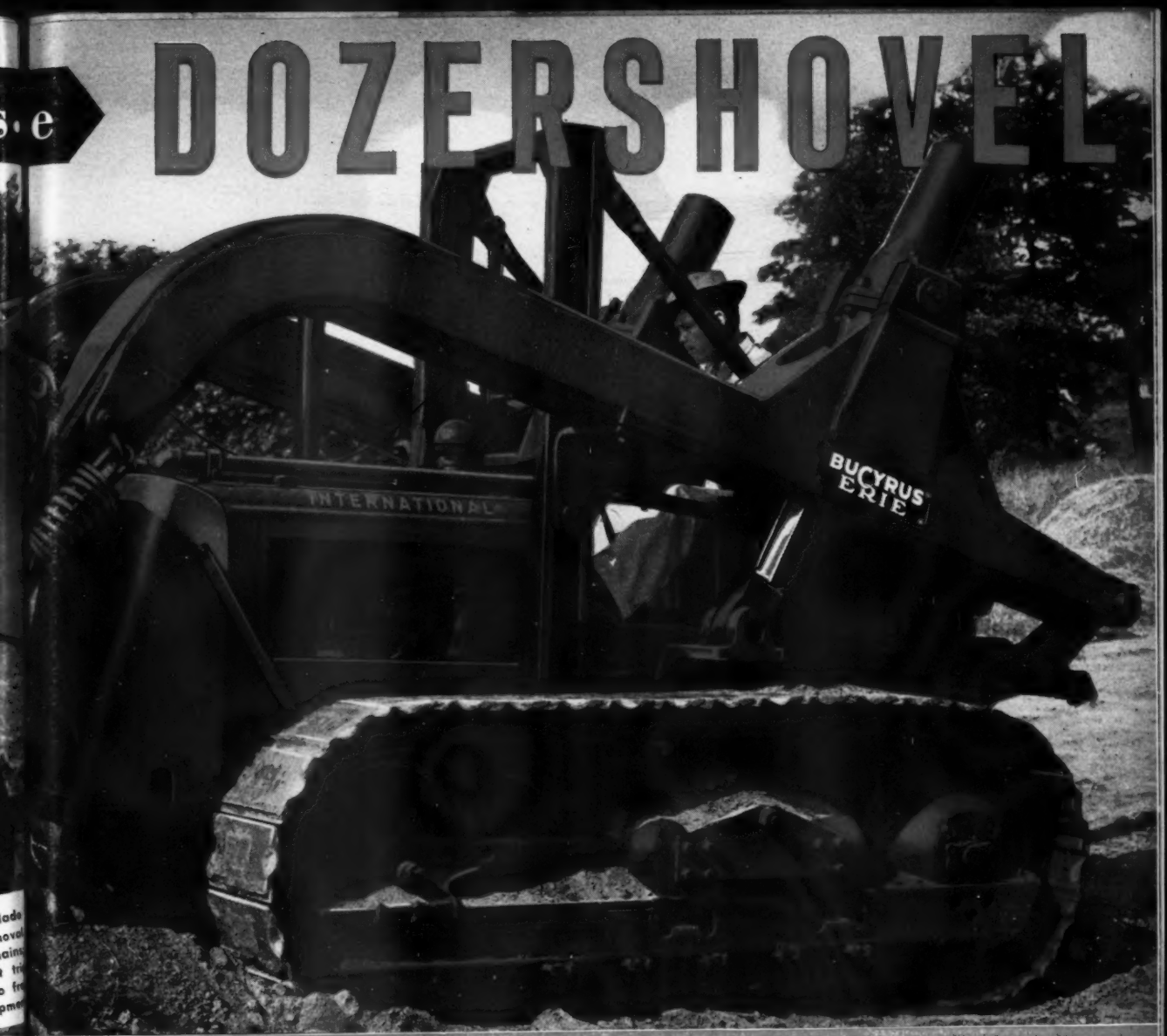
N 50C

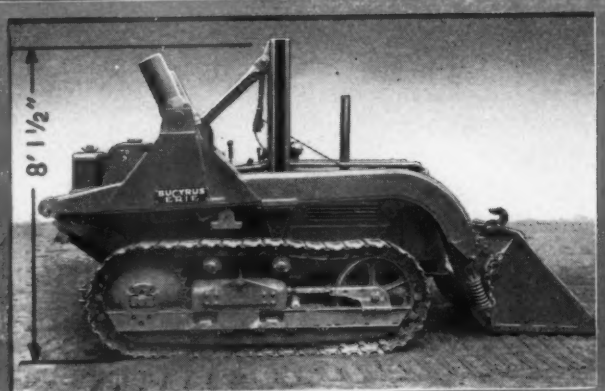
INTERCHANGEABLE — Installation of auxiliary dozer blade is just a matter of minutes. Changeover involves only: removal of five pins holding the bucket, trip latch, and limit chains; setting dozer blade in place; replacing pins. The bucket tr mechanism also allows tipping the dozer blade forward to fr it of its load on uphill dozing — a genuinely new developme

OSCILLATING TRACKS — Both "feet" are always on the ground for level cutting or grading, smooth operation, great stability, low operator fatigue, increased safety.

SMOOTH, POWERFUL DOZING ACTION — A full-fledged dozer in e respect, this unit features positive down pressure for easy penetration in h materials, hydraulic control for smooth, level dozing. Down pressure up 4200 lbs. is available on the blade.

DOZERSHOVEL





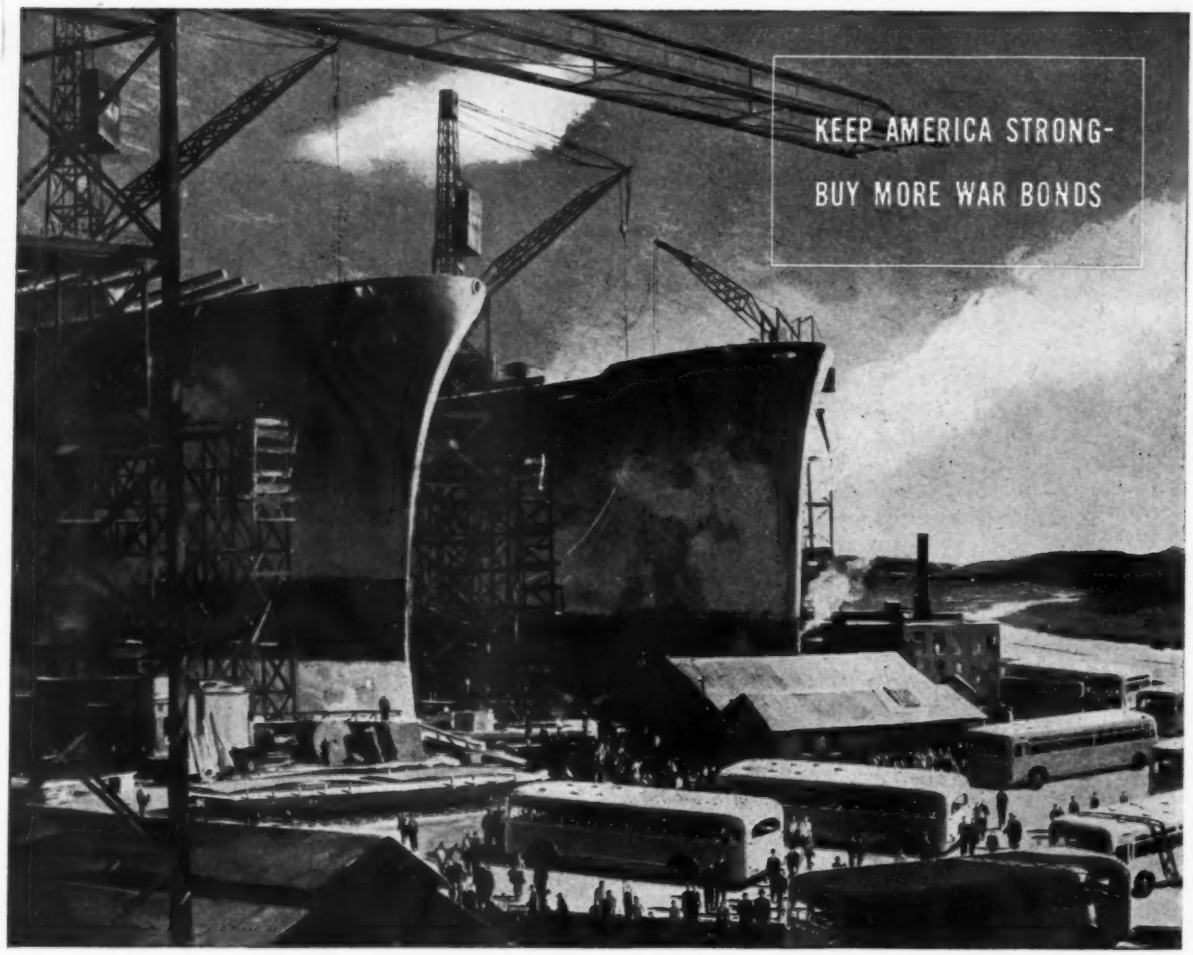
NOBSTRUCTED VISIBILITY — There's no ...essing the load" with this unit. Its lack of ...d spots allows loading a full bucket and ...ck, accurate dumping — or dozing a full ...le and a level surface. This feature re... operator fatigue, too.

LOW OVERHEAD CLEARANCE — With an over-all height of only 8' 1½", the DOZERSHOVEL permits working in close quarters, getting in and out of buildings, and transportation from job to job on trailers without necessitating selection of routes to avoid underpasses.

CRANE APPLICATION — The hook on the bucket or dozer blade allows use of the unit for lifting crane service. A chain sling is available as auxiliary equipment.

BUCYRUS ERIE
TRACTOR EQUIPMENT

SEE YOUR
INTERNATIONAL TRACTRACTOR
DISTRIBUTOR



PEACETIME TRANSPORTATION ON A WAR JOB

One important peacetime use of Diesels got a good start well before the war—low-cost transportation. Long engine-life, long periods between overhauls, long mileage on inexpensive fuel, and steady stick-to-it operation add up to new economies in travel.

NEARLY every Diesel engine General Motors makes now goes to work for Uncle Sam.

Most of them go right into the fighting—into tanks, trucks and tractors, into combat ships, patrol boats and landing barges.

But here are GM Diesels doing a big wartime job in a home front application.

It's a Navy "task force" of some 250 General Motors Diesel coaches that carry thousands of Mare Island Navy Yard workers in California to and from the job every day over a fifty-mile radius.

These are doing the same day-in-day-out dependable job which thousands of GM Diesel-powered coaches were doing before.

And they point to the days ahead when General Motors can devote its expanded plants to providing bus operators with engines and parts improved and refined through their work at war.

GM
GENERAL MOTORS
DIESEL POWER

ENGINES..15 to 250 H.P... **DETROIT DIESEL ENGINE DIVISION,** Detroit, Mich.

ENGINES..150 to 2000 H.P..CLEVELAND DIESEL ENGINE DIVISION,.Cleveland, Ohio

LOCOMOTIVES.....ELECTRO-MOTIVE DIVISION, La Grange, Ill.

Dear Mom:
I'm among old friends way over here ~ today a B-G plant + I helped assemble when" Barber-Greene!
" her

We have had to learn to walk and to save fuel and stop overeating. Prices are going up with taxes. We at home — among familiar scenes and faces—are having it "tough."

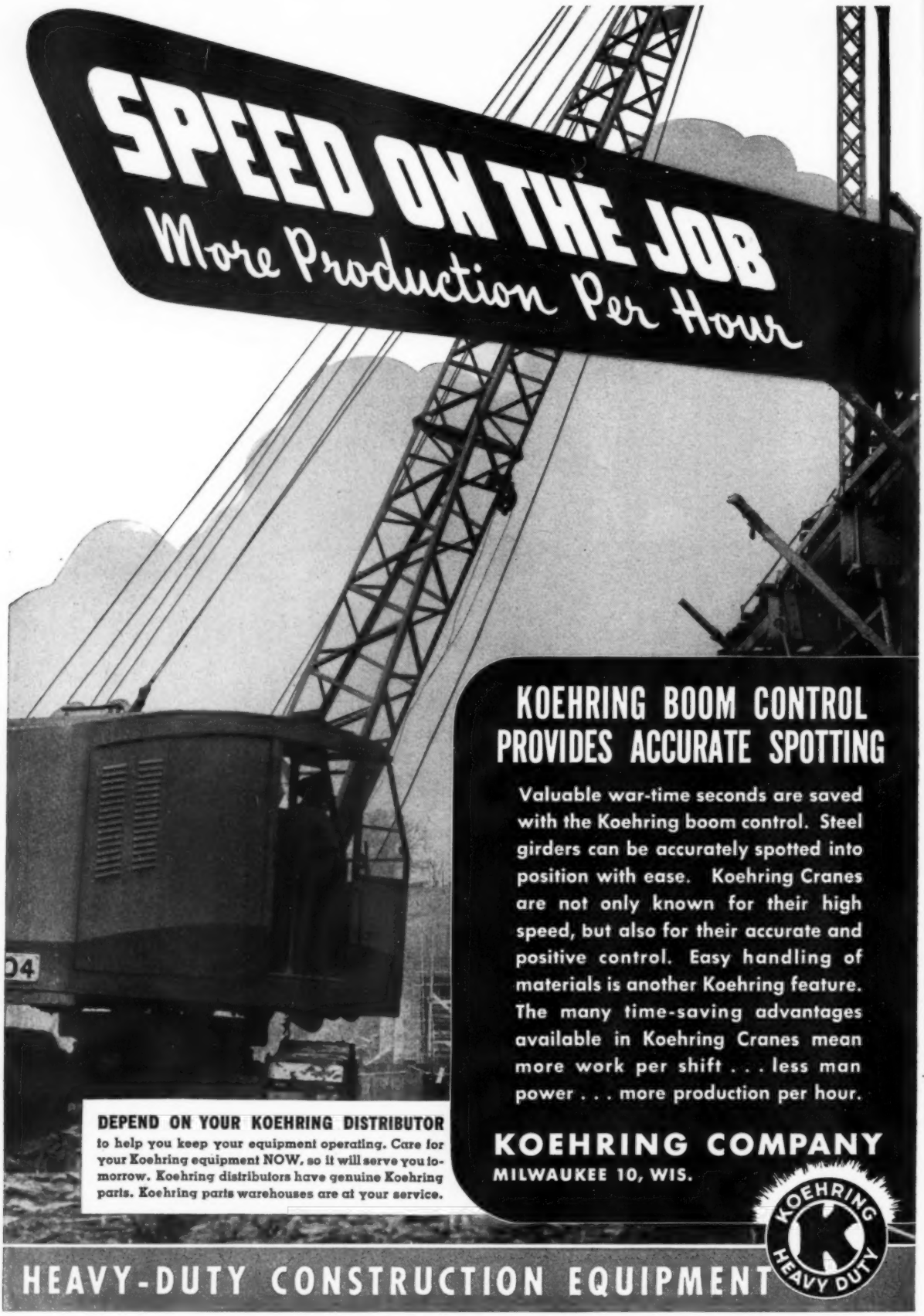
But Harry, our office boy, wrote of the thrill he got meeting a Barber-Greene Ditcher as he marched into Bizerte. He, and 126 other Barber-Greeners in Service write us with nostalgia of meeting Barber-Greene machines on foreign soil. To them, those pounding, unlovely masses of welded steel represent HOME. To them, in Africa, Sicily, the South Pacific, Alaska, Greenland, Iceland, those machines working in burning sands, coral atolls, or frozen tundra are the one familiar sight. Home!

Those in service inspire us—as they must all producers of war goods — to "E" production and "Star" production. As we get more and more of these reminders of home — American construction equipment,—out of the plants to the front, we will hasten that day when home is really home, and not just a memory inspired by a mass of steel at Bizerte, Berlin or Tokyo.

43-4

BARBER-GREENE

AURORA, ILL.



KOEHRING BOOM CONTROL PROVIDES ACCURATE SPOTTING

Valuable war-time seconds are saved with the Koehring boom control. Steel girders can be accurately spotted into position with ease. Koehring Cranes are not only known for their high speed, but also for their accurate and positive control. Easy handling of materials is another Koehring feature. The many time-saving advantages available in Koehring Cranes mean more work per shift . . . less man power . . . more production per hour.

KOEHRING COMPANY
MILWAUKEE 10, WIS.

DEPEND ON YOUR KOEHRING DISTRIBUTOR
to help you keep your equipment operating. Care for your Koehring equipment NOW, so it will serve you tomorrow. Koehring distributors have genuine Koehring parts. Koehring parts warehouses are at your service.

KOEHRING HEAVY DUTY

HEAVY-DUTY CONSTRUCTION EQUIPMENT

The Navy knows the Answers

In our Navy, the world's most formidable fighting machine, Diesel-powered craft of all kinds are lubricated with Standard of California's RPM DELO. The answers in this naval quiz tell you why. They'll solve your problems on how to squeeze more efficiency out of your Diesels—and cut maintenance costs.

Q. Can a submarine drown in air?

A. Yes. Her Diesels "breathe in" great quantities of air which cause ordinary oils to turn gummy, stick rings and hasten engine failure. In today's subs, RPM DELO eliminates this ring-sticking, reduces sludge and deposits—greatly increases cruising range.

Q. How do you put a bone in the teeth of a DE?

A. Powerful Diesels put that speed wave under the bow of a Destroyer Escort. With RPM DELO lubricating her big engines and keeping them at top efficiency, a Destroyer Escort can sprint like a racehorse, even at the end of a long convoy trip.

Q. What is the most explosive part of a minesweeper?

A. Her engine. Thousands of times a minute, fierce explosions sear her cylinders. But they're safe with RPM DELO because it contains special additives that make it cling to hot spots, give constant point-of-wear protection, even under most severe conditions.

Q. What is the most important duty of a landing barge?

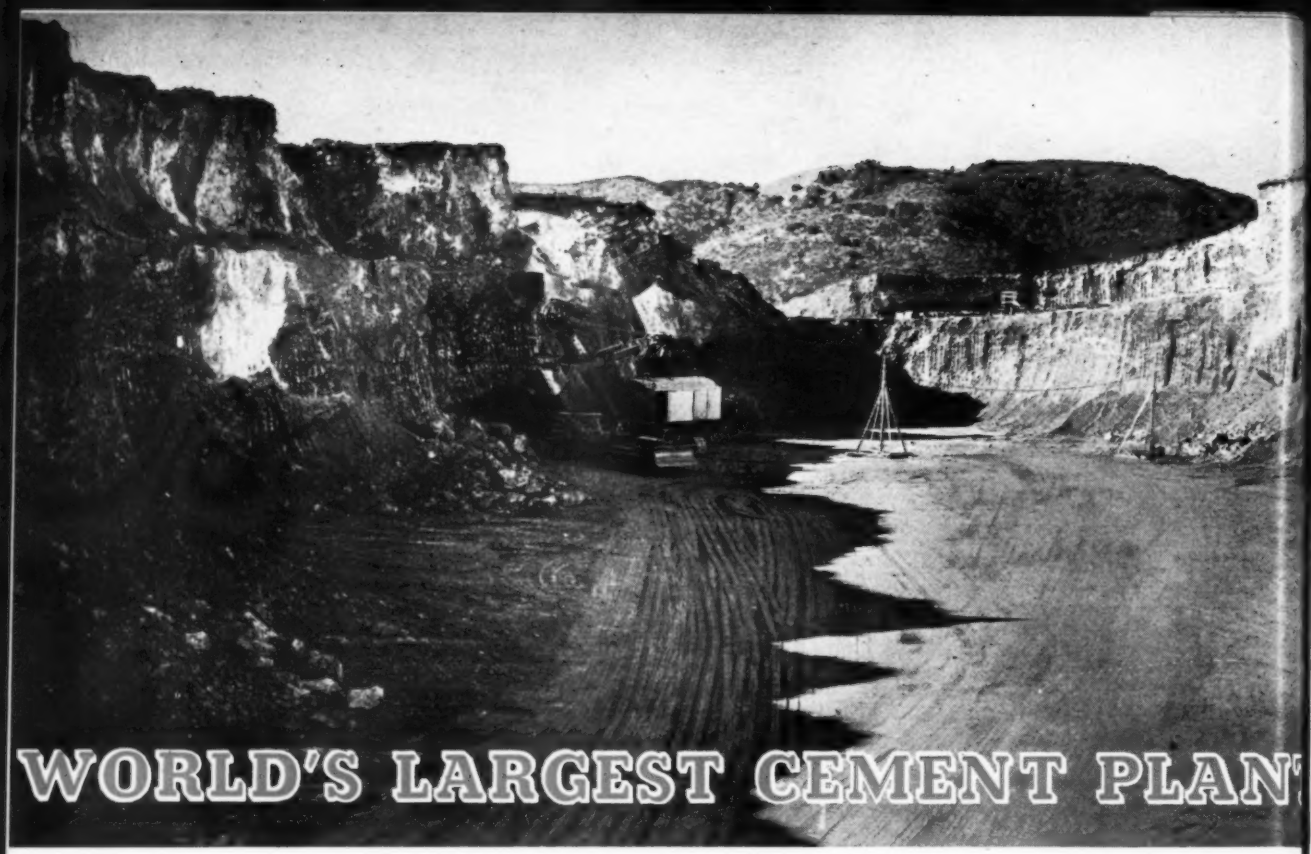
A. To keep in action—because a beachhead breakdown could be disastrous. RPM DELO in a landing boat's Diesel gives it extra protection against breakdowns. RPM DELO often cuts Diesel repair bills in half, doubles the time between overhauls, minimizes wear.

RPM DELO

RPM DELO is marketed under the following names: RPM DELO • Caltex RPM DELO
Kyso RPM DELO • Signal RPM DELO • Imperial-RPM DELO CONCENTRATE • Sohio RPM DELO

STANDARD OIL COMPANY OF CALIFORNIA

Ask your Diesel engine manufacturer or distributor for the RPM DELO supplier in your vicinity



WORLD'S LARGEST CEMENT PLANT

Bucyrus-Erie 5-cu. yd. and Marion 2½-cu. yd. shovels dig limestone from mountain quarries to feed the Permanente Cement Company plant in the hills of the San Francisco peninsula. Entire process, from raw material to finished cement, is integrated within a short radius and flow of all materials from quarries to storage silos is downhill

By R. F. SWEET

• Bucyrus-Erie 5-cu. yd. shovel fills 25-cu. yd. LeTourneau buggy powered by Caterpillar D-8 tractor in mountain-top limestone quarry.

THE STORY OF THE world's largest cement plant provides interesting sidelights on the part of earth-moving equipment in furthering the war effort. Concrete pillboxes on Wake and Guam, airport runways at Hickam Field, gun emplacements at Pearl Harbor—these and many others of our war works had their origin when a 5-cu. yd. electric shovel bit into a limestone bank at Permanente, California.

For cement from the plant of Permanente Cement Company in the hills of the San Francisco Peninsula has been used almost exclusively for the United States Naval installations of the Pacific Islands. Many of the Army works, too, have been built of concrete whose cement came from this plant, and Shasta Dam, the key unit of the $170,000,000 Central Valley Project which will soon be supplying hydroelectric power for war industries of northern California, is being built with cement from Permanente.

As a matter of fact, it was to supply the cement for Shasta Dam that the plant was originally built. The U. S. Bureau of Reclamation announced bids would be received May 1, 1939, for the 5,800,000 barrels of low-heat portland cement which were necessary for the structure. Henry J. Kaiser, whose construction record covered such projects as Boulder, Bonneville and Grand Coulee Dams, and a group of associates, formed The Permanente Corporation (the name was later changed to the present title) and submitted the low bid. The amount of cement required for Shasta and its appurtenances was subsequently increased to 6,670,000 barrels.

The situation was unique, for Permanente had no cement plant. However, they had the equipment, the experience and the men to build the plant—an aggregation probably unexcelled in the history of construction. And the team was sparked by a man whose vocabulary does not include the word "can't"—Henry J. Kaiser.

Moreover, Permanente had located a limestone deposit of excellent composition and had staked out and core drilled 35 million tons of rock.

Established Construction Record

The contract was awarded on June 10, 1939, and construction started on June 28. Specifications called for delivery of cement on March 15, 1940, but the first barrel was run through the kilns on Christmas day of 1939, six months after breaking ground—a record for cement plant construction. This original work had included excavation and placement of one and one half million cubic yards of earth and construction of a

plant with an annual capacity of two and one half million barrels of cement.

Subsequently, to handle increasing war demands, the plant has been expanded twice until today its yearly production is five million barrels, making it the largest cement-producing unit in the world.

The materials handling operations at Permanente is of more than usual interest for it combines the use of modern excavating equipment, large-capacity hauling units and extensive conveying systems. The limestone and clay quarries are located on a mountain immediately behind the plant. It's interesting to note at this point that the entire process, from raw materials to finished cement, is integrated within a short radius and that the flow of materials from quarry to storage silos is downhill. These two factors have simplified materials handling, cut transportation costs and made for a streamlined materials flow.

The limestone deposit is well fractured, and as a consequence blasting is cut to a minimum. The quarry average is about 85 per

• **Above: Hauled by a Caterpillar D-8 tractor, one of the 25-cu. yd. LeTourneau buggies is on its way to the limestone surge pile. Insert: The buggy discharges into the surge pile from where the material is reclaimed onto a 180-foot conveyor belt which brings it to the primary crusher. Middle: This 11,-700-foot conveyor takes material from the primary crusher to the screening tower. Bottom: The screening tower, located above the stockpiles, where rock, 2½" to 6" is segregated for deposit on the sugar rock stockpiles, and minus 2½" rock is discharged onto the cement rock stockpile.**

• This 5-cu. yd. electric shovel excavates limestone at the top of the hill above the plant, loading it into the LeTourneau buggies. Due to the highly fractured nature of the deposit, very little blasting is necessary.

cent calcium carbonate, with large sections containing over 98 per cent. The material is such that the finished cement has a high percentage of combined silicates and low alkali content, both of which features result in a stable and enduring product.

Limestone is now being excavated on the top of the mountain, although another quarry has been developed at a lower elevation. The limestone is excavated by a Bucyrus-Erie 120-B electric shovel equipped with Ward-Leonard controls and a 5-cu. yd. Esco dipper. It feeds three 25-cu. yd. and one 30-cu. yd. LeTourneau buggies, pulled by Caterpillar D-8 tractors.

The length of haul from shovel to hopper was about 500 yards at the time this job was covered. One shift was being worked, and approximately 4,500 tons per shift were being deposited on the belt each shift as an average. The equipment was being worked six days a week, with the seventh day for overhaul and general maintenance.

Good Performance Record

The big 120-B has had, according to the quarry superintendent, a very good performance record. It has been on the job for four years—since the quarry was first opened—and a minimum of time has been spent on repairs. Another valuable feature is its portability—it travels at a good speed and can be moved to new locations with a minimum of lost time. Counting stripping, access road work and pit excavation since it was placed on the job, it is estimated that the machine has excavated some 7,000,000 tons of material.

For general operating efficiency and to help cut shut-down time for the shovel, preformed wire rope has been adopted. The electric shovel uses 1½-inch 6x21 lang-lay type preformed rope which has been found to give very good service life. This rope, because of the strength afforded by its wire center, has unusual resistance to compressive loads on the individual strands as well as greatly increased breaking strength. The features added by the preforming process, such as flexibility, resistance to bending fatigue, and better spooling quality, have contributed toward getting about 600 hours service life out of the rope.

Another factor which has added to the output of the machine has been the time saved in repacing worn rope. The preformed rope, being more flexible and easy to handle, can be reeved through the sheaves and installed much faster.

Limestone is dumped from the buggies onto a surge pile of about 3,500 tons capacity, from which it is reclaimed onto a 48-inch wide conveyor belt 180-feet long for transportation to the primary crusher. At this point it might be noted that 200-hp. synchronous regenerative type motors are used to drive the main conveyor belts. As the haul is downhill, the mo-

• At the lower limestone quarry this 2½-cu. yd. shovel discharges the material into White 15-ton trucks which haul it to the crushers.

tors are used as such only for starting—when the belts are operating under full load, they generate about 350 hp., which is returned to the system. This energy is sufficient to run the 120-B shovel.

The primary crusher, a Farrel-Bacon 24x36 unit, reduces the rock to a maximum of six inches and deposits it onto a 36-inch conveyor line aggregating 11,700 feet in length and leading to the screening tower. Goodyear belting is used.

Limestone is also being obtained from the lower quarry. Here a Marion 2½-cu. yd. shovel excavates the material and loads it into 15-ton White trucks which transport it to the crushing unit. This shovel is likewise equipped 5834—Fowle—H Ex. Engr. 5 with preformed wire rope, which is giving service life of about 500 hours. The machine operates on a one-shift basis, digging a year around average of 1,500 tons per day.

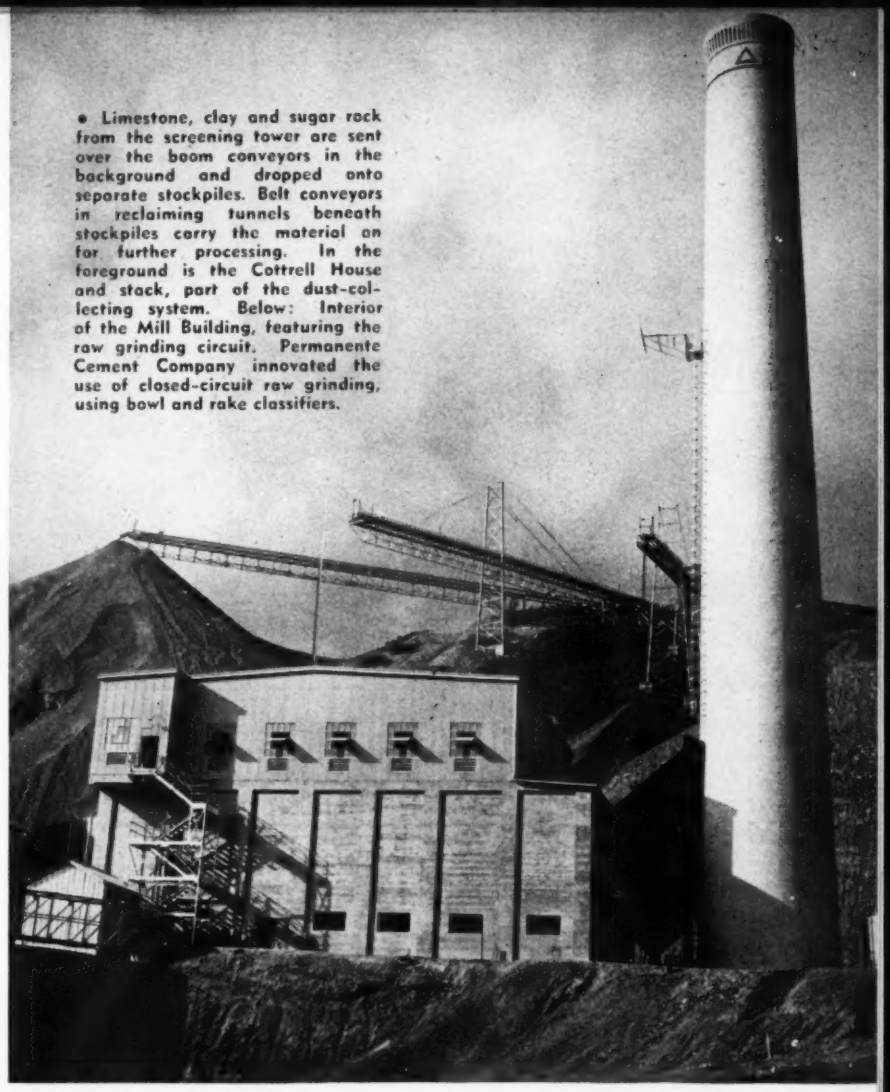
Clay from Mountain Deposit

The crushing unit at this site comprises a T. L. Smith 20-inch gyratory crusher and the screen is an Allis-Chalmers, 5'x10'. Rock is fed onto the main belt by a 48-inch line, 8,600 feet long.

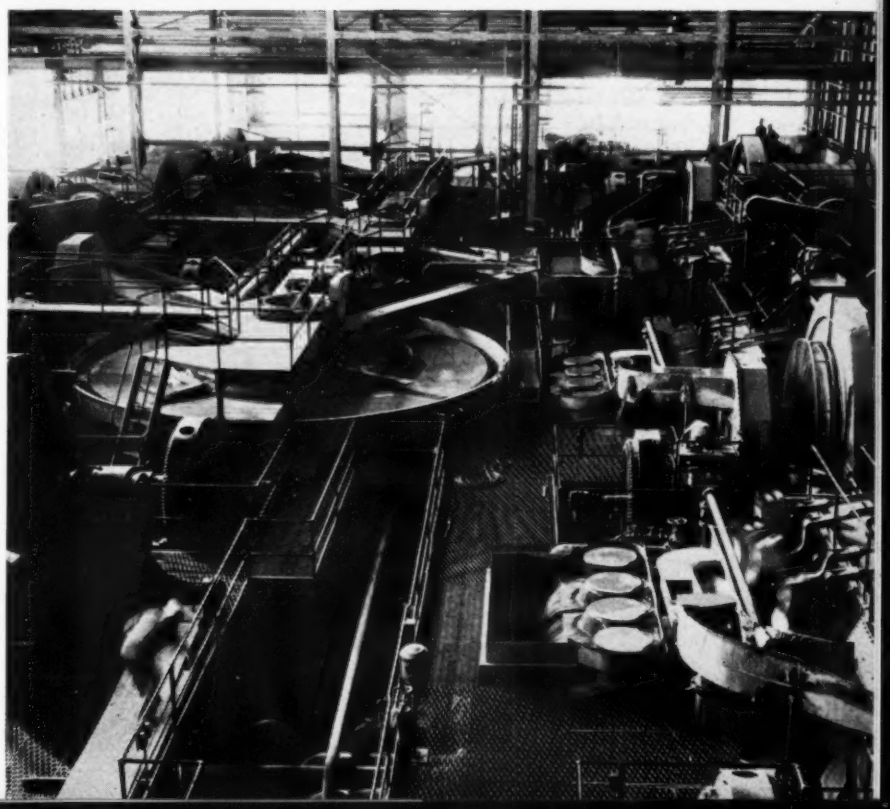
The ingredients of cement are fundamentally limestone, clay and minor quantities of gypsum. The clay is obtained at a deposit on the mountain, being excavated by LeTourneau 15- and 20-cu. yd. Carryalls. There are three Caterpillar D-8 tractors at this quarry. Clay joins the main belt via a shorter feeder belt.

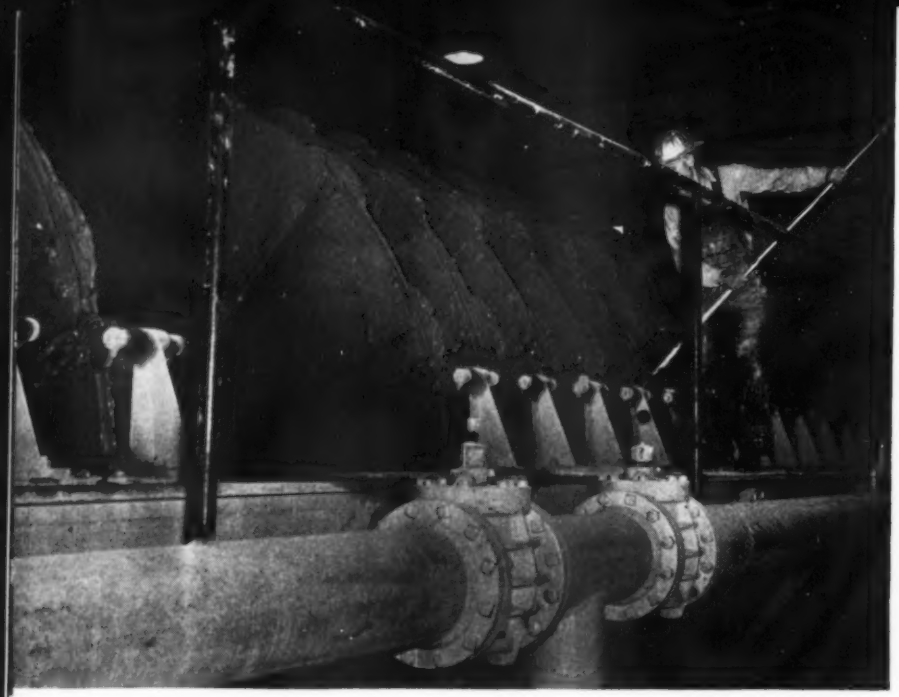
At the screening tower, which used Ty-Rock screens, minus 2½-inch rock is selected for the cement rock stockpile, and rock ranging between 2½-inch and 5½-inch is segregated for deposit on the sugar rock stockpile. Sugar rock is a high grade limestone produced here as a by-product and sold to beet sugar manufacturers for use in the sugar refining process.

From the screening tower, the limestone, clay and sugar rock are sent over boom conveyors and dropped onto three stockpiles, one for each material. Reclaiming tunnels are built under each stock-



• Limestone, clay and sugar rock from the screening tower are sent over the boom conveyors in the background and dropped onto separate stockpiles. Belt conveyors in reclaiming tunnels beneath stockpiles carry the material on for further processing. In the foreground is the Cottrell House and stack, part of the dust-collecting system. Below: Interior of the Mill Building, featuring the raw grinding circuit. Permanente Cement Company innovated the use of closed-circuit raw grinding, using bowl and rake classifiers.





• Part of the slurry from the raw grinding circuit is dewatered in these Oliver United filters. Accurate control of the water percentage in the kiln feed is made possible with these units.

pile, and belt conveyors operating in these structures carry the materials on for further processing.

That takes care of the raw materials. Now they must go through various grinding and burning stages before they become the grey substance that is finding its way into our island fortifications, our Army flying fields, our great dams. To the engineer, this is a most interesting process, for this plant is recognized as the world's most modern, containing many innovations.

Limestone is conveyed to the secondary crusher where it is crushed in a Symonds 5-foot cone crusher and a Symonds 3-foot cone crusher, screened on Ty-Rock and Allis-Chalmers screens and sent for its first trip into the mill building. The secondary crusher installation also includes a Dorr bowl sand classifier for reclaiming the fines.

Permanente was the first cement company to use the closed-circuit method of rawgrinding wherein the ball mills are closed-circuited with rake and bowl classifiers. This system enables accurate control of the fineness of material and increased production. There are two 9½′ x 10½′ ball mills, of Allis-Chalmers and Smidth manufacture, and one Traylor 9½′ x 10′ ball mill. These are closed-circuited with Dorr rake classifiers with 16-foot rakes.

The company has found that the closed-circuited system of raw grinding increases the rate of mill capacity because it eliminates excess grinding and controls the fineness of the product at approximately 95 per cent passing a 200-mesh sieve as well as eliminating spitzers.

The light slurry from the primary mills and classifiers is then pumped to a series of three thickening tanks. Two of these are 150 feet in diameter by 10 feet deep while the third has a 125-foot diameter and is 10 feet deep. These thickeners de-water the slurry from about 80 per cent water to a slurry containing from 40 to 45 per cent water. From this point part of the slurry is pumped to the filtering installation consisting of one Oliver United single unit continuous disc type filter and one Oliver United double unit of the same type. These filters de-water the slurry so that it can be sent back to the unfiltered slurry for control for the percentage of water in the kiln feed. The next step is the blending of the limestone slurry in the blend tanks.

The clay is reclaimed from the stockpile and conveyed to the clay grinding facilities, comprising one Traylor and one Smidth tube mills, 7′ x 26′. Screening is done on three Hummer 4′ x 6′ single deck screens, from which the material is conveyed to the blending tanks. The purpose of the clay used is to impart the silica, iron and alumina necessary to make cement.

From the blend tanks, the cement slurry is pumped to storage tanks. From here it is fed by three Smidth single spiral scoop feeders and one Traylor 27-inch ferris wheel feeder to the kilns for burning. The kilns are unusually large, being exceeded in size

(Continued on page 628)

• The four large kilns at Permanente. Three are 12′ x 463′, and one is 12′ x 450′. They range among the largest in the world.

Post-War Highway Planning

III

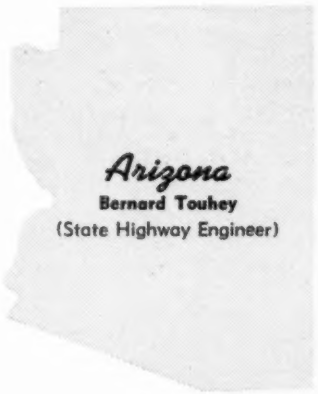
The post-war highway planning situation in Arizona, Arkansas, Delaware, Georgia, Maine, Massachusetts, Missouri, Montana, Nevada, South Dakota, and Wyoming is given in this third of a series of articles on the subject.

THE manpower, equipment, and materials shortages and other wartime restrictions are causing the country's highways to wear out faster than they are being replaced. In addition to these replacements and repairs, we need new and improved highways to serve the post-war world with its rising standard of living and its increased production of war-depleted goods. This essential highway program can provide hundreds of millions of dollars for needed post-war employment if properly energized.

Highway construction, and of course, post-war highway planning, is primarily a state problem. All states that have reported to date in the Excavating Engineer survey realize the great importance of highway planning for the post-war era. Unfortunately, however, lack of adequate engineering personnel in all states, and particular problems of finance and legislation in some states, does not permit all states in the union to go ahead with their plans so that all will be in readiness to let contracts to effect maximum employment and to start work on these immediately after peace-day.

Excavating Engineer presents the results of its survey in another group of states, in all sections of the country, in this third of a series of articles on post-war highway planning.

The status of post-war highway planning programs in 24 states — Alabama, California, Connecticut, Indiana, Illinois Kansas, Kentucky, Minnesota, Mississippi, New Jersey, New York, North Dakota, Ohio, Oklahoma, Pennsylvania, Rhode Island, Texas, Vermont, Virginia, West Virginia, and Wisconsin—was published in the October and November, 1943, issues of EXCAVATING ENGINEER.

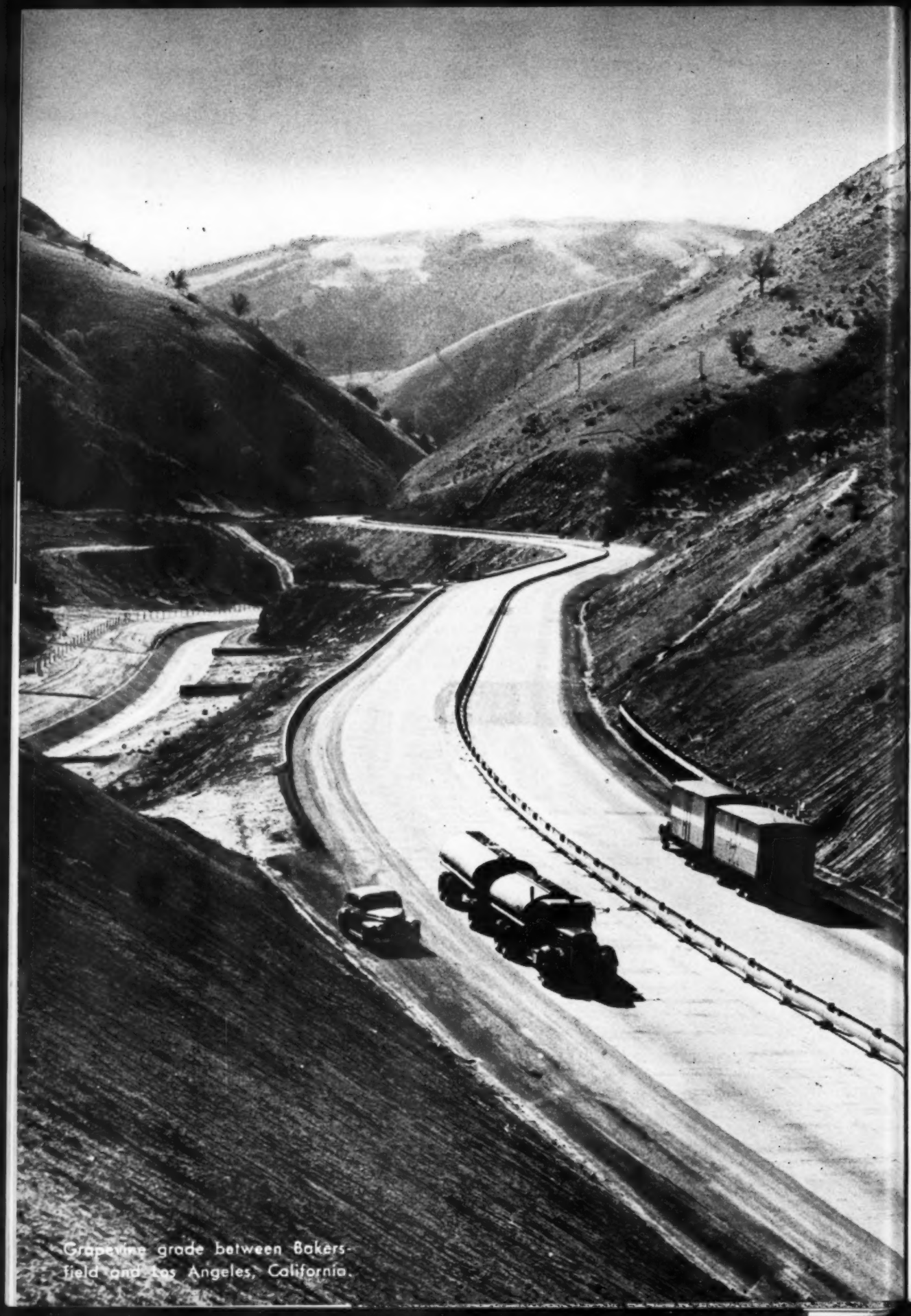


Arizona

Bernard Touhey
(State Highway Engineer)

The Arizona Highway Department has, within the past two months, substantially increased the personnel in the technical divisions in a determined effort to complete surveys, plans and estimates on post-war projects that will involve expenditures of approximately $50,000,000.

We will have plans and estimates completed within 30 days on projects amounting to $1,100,000. By the end of the calendar year, we expect to have plans and estimates completed for projects amounting to $3,400,000 and by June 30, 1944, we expect to have ready plans and estimates on



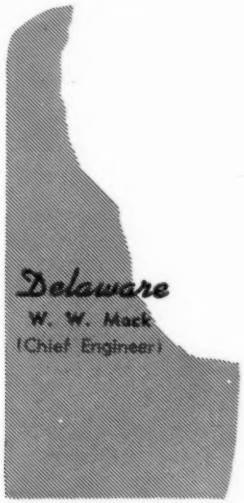
Grapevine grade between Bakersfield and Los Angeles, California.

projects amounting to $12,700,000.

We are experiencing difficulty in securing technical help—surveyors, draftsmen, bridge designers, and experienced help for the materials division. However, with a small increase in our present personnel, we expect to be able to complete plans and specifications according to the schedule as outlined above.

We regret to say that of the 14 counties in Arizona, only five have county engineers. We have been endeavoring, and will continue in our efforts, to create interest in the counties in a post-war program for secondary and feeder road construction, wherein county funds will be used to match federal funds.

Our two largest centers of population, Phoenix and Tucson, are proceeding with plans for post-war construction, and both will undoubtedly be ready to let post-war contracts promptly in considerable amounts.



Delaware's tentative post-war highway program will provide for the reconstruction of approximately 200 miles of highways, the widening of approximately 100 miles of highways, the new construction of 60 miles of dual highways, as well as several new bridges and grade crossing elimination structures.

Possibly $250,000 in contracts are now ready to let and little more will be available by the end of the calendar year of 1943.

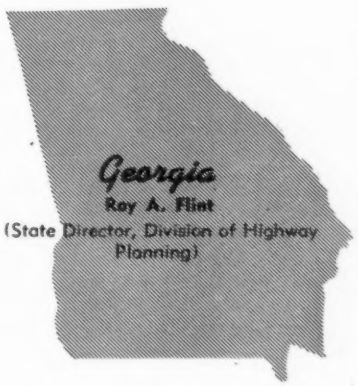
The bottleneck at the present time is the lack of engineers, surveyors and draftsmen.

The state highway department builds and maintains all highways and streets in Delaware, outside of incorporated cities, as well as the main roads as through incorporated communities, so there are no county or township roads to be considered.

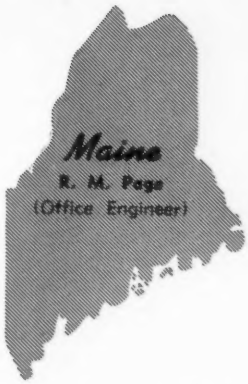
We have no information as to any program for city streets. The City of Wilmington is the only municipality in this state of over 10,000 population.

We are not prepared at this time to release detailed information on post-war highway projects for Arkansas. Our work is in a preliminary stage and due to a shortage of personnel, and because of other work which has been under way, we have not proceeded as far with our post-war program as some of the other states.

We believe, however, that we will be in a position within the next six months to release to the press a list covering quite a number of projects.



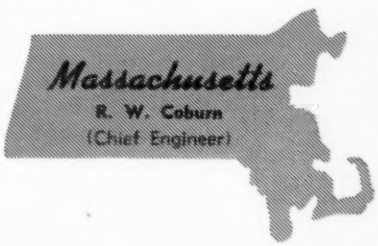
Post-war highway work in Georgia is still in the planning stage and studies are being made relating to the creation of definite post-war programs.



The state highway department of Maine has made and is making surveys for post-war work. At this time we have surveys and plans for 10 to 95 per cent completed for approximately $9,833,000 on the Federal Aid Highway System; approximately $1,548,000 of secondary highway projects and approximately $3,863,000 on bridge projects.

It is believed that the above described projects would provide nine to ten million direct construction man hours.

In addition to these we have a number of advance engineering surveys which have been approved by the federal government. Work on several of these projects has already been started.



Under the Massachusetts post-war highway program there is now approximately $7,500,000 worth of work ready to be put under contract, or which could be made ready in 30 days time.

We also have in preparation surveys, plans, and estimates on approximately $30,000,000 worth of additional work.

Our chief bottleneck, if any, at the present time is in the matter of engineers, surveyors and draftsmen. Many of our engineers are, of course, in the service and some are engaged in defense

(Continued on page 622)

WPB CENSUS OF CONSTRUCTION-TYPE EQUIPMENT IN THE U.S.A.

Inventory made by the Construction Machinery Division of WPB from Regional Offices reports gives estimate of number and age of various units in U.S.A.

CONSTRUCTION machinery in this country is old. More than one-third of it is now more than 13 years old and less than 37 per cent falls within the model years classification, 1938-1942. Particular items, as should be expected, vary considerably from this over-all generalization as to age. The most noteworthy items of which about half or more are more than 13 years old are: buckets, 50%; cranes 49%; crushers, 52%; ditchers, 58%; engines, 53%; hammers, 48%, and hoists, 71%.

Conclusions regarding the age of construction machinery in the country are the result of a survey made from January through March, 1943, by WPB's Construction Machinery Division regional specialists. Each of the WPB Regional Offices (except Denver, which was unable to report) reported to the Construction Machinery Division an analysis of all the used equipment on its records following the survey. The Regional Office analysis reported to the Construction Machinery Division grouped the equipment into two major classifications: **available** (for sale, rent or lease) and **unavailable.** Under each major classification there are several sub-classifications. One attempted to classify the equipment according to its **condition;** that is, whether it was in "good", "fair", "poor", or "unknown" condition. Another sub-classification gave the **age** groups under headings "unknown", "prior to 1919", "1920-1929", "1938", "1939", "1940", "1941", and "1942". From this summary the model years were selected as a more exact index of the condition of any piece of equipment than the qualitative appraisal represented by the "condition" classifications which seemed less accurate and dependable. The choice of the age groups used

Inventory of Used Construction-type

PRODUCT	Estimated Total Units in U.S.A.	Total Units Tabulated	PERCENTAGE DISTRIBUTION BY AGE GROUPS: Prior to 1930 Percent	1930-37 Percent	1938-42 Percent
Asphalt Surface Heaters	98	49	47	35	18
Backfill Tampers	1,664	832	29	18	53
Backfillers	230	115	84	10	6
Bins, Aggregate	1,948	974	50	22	28
Bituminous Distributors	864	423	20	52	28
Bituminous Htg. Kettles	320	160	24	30	46
Bituminous Sprayers	3,310	1,655	27	38	35
Buckets—Total	25,614	12,807	55	19	26
Clamshell	**13,192**	**6,596**	**63**	**17**	**20**
Concrete	**4,282**	**2,141**	**44**	**20**	**36**
Dragline	**5,642**	**2,821**	**43**	**19**	**38**
Hoisting	**2**	**1**	--	--	**100**
Miscellaneous	**454**	**227**	**68**	**19**	**13**
Orange Peel	**724**	**362**	**73**	**19**	**8**
Scraper	**772**	**386**	**58**	**21**	**21**
Shovel	**490**	**245**	**52**	**31**	**17**
Snow	**56**	**28**	**50**	**39**	**11**
Compressors—Total	28,096	14,048	38	26	36
Up to 60 cu. ft.	**2,550**	**1,275**	**33**	**19**	**48**
61 to 160 cu. ft.	**17,044**	**8,522**	**39**	**26**	**35**
161 to 315 cu. ft.	**5,328**	**2,664**	**42**	**27**	**31**
315 cu. ft. & over	**3,174**	**1,587**	**38**	**25**	**37**
Concrete—Total	8,716	4,358	43	22	35
Buggies & Carts	**3,500**	**1,750**	**51**	**16**	**33**
Finishing Machines	(See Next Column)				
Pavers	**3,106**	**1,553**	**48**	**31**	**21**
Portable Hoppers	**124**	**62**	**63**	**11**	**26**
Spreaders	**426**	**213**	**14**	**25**	**61**
Vibrators	**1,560**	**780**	**20**	**15**	**65**
Conveyors	2,904	1,452	45	23	32
(Construction materials portable type and for portable plant)					
Cranes—Total	17,114	8,557	49	23	28
Crawler Cranes	**15,168**	**7,584**	**50**	**23**	**27**
⅜-⅝ cu. yd.	**4,118**	**2,059**	**42**	**27**	**31**
¾-1 cu. yd.	**6,966**	**3,483**	**56**	**20**	**24**
1¼-1¾ cu. yd.	**3,108**	**1,554**	**49**	**24**	**27**
2 cu. yd. and up	**976**	**488**	**41**	**23**	**36**
Truck Cranes	**1,946**	**973**	**37**	**22**	**41**
⅜ cu. yd.	**400**	**200**	**43**	**30**	**27**
½ cu. yd.	**1,050**	**525**	**43**	**22**	**35**
¾ cu. yd.	**496**	**248**	**20**	**16**	**64**

PRODUCT	Estimated Total Units in U.S.A.	Total Units Tabulated	PERCENTAGE DISTRIBUTION BY AGE GROUPS: Prior to 1930 Percent	1930-37 Percent	1938-42 Percent
Crushers (Portable Type) Total	5,868	2,934	52	25	23
Cone	**312**	**156**	**56**	**17**	**27**
Gyrators	**886**	**443**	**69**	**16**	**15**
Jaw	**4,268**	**2,134**	**51**	**28**	**21**
Roll type	**402**	**201**	**27**	**24**	**49**
Derricks—Total	960	480	70	17	13
Guy—circle	**344**	**172**	**74**	**13**	**13**
Stiff leg	**616**	**308**	**67**	**19**	**14**
Ditchers—Total	2,868	1,434	58	17	25
Blade	**92**	**46**	**46**	**11**	**43**
Ladder	**1,894**	**947**	**65**	**17**	**18**
Wheel	**882**	**441**	**44**	**18**	**38**
Draglines (Crawler draglines classified as cranes)	464	232	34	29	37
Dredges	1,156	578	68	17	15
Drills—Total	6,158	3,079	37	21	42
Blast Hole	**862**	**431**	**27**	**21**	**52**
Core	**664**	**332**	**39**	**23**	**38**
Rock	**1,830**	**915**	**50**	**19**	**31**
Rock (portable)	**2,024**	**1,012**	**29**	**19**	**52**
Well	**778**	**389**	**35**	**31**	**34**
Dryers	38	19	26	0	74
Earth Boring Machinery	862	431	38	19	43
Engines—Total	6,880	3,440	53	20	27
Diesel	**1,238**	**669**	**35**	**14**	**41**
Gas	**5,542**	**2,771**	**57**	**19**	**24**
Finegraders-Subgraders	406	253	32	33	35
Finishing Machines—Total	2,914	1,457	31	26	43
Bituminous	**894**	**447**	**18**	**27**	**55**
Concrete	**2,020**	**1,010**	**36**	**26**	**38**
Graders—Total	69,386	34,693	29	37	34
Elevating	**2,520**	**1,260**	**33**	**45**	**22**
Motor	**36,114**	**18,057**	**18**	**35**	**47**
Hand-controlled Pull type	**27,890**	**13,945**	**43**	**38**	**19**
Power-controlled Pull type	**2,862**	**1,431**	**25**	**42**	**33**
Hoists—Total	12,688	6,344	71	16	13
Single Drum	**3,286**	**1,643**	**64**	**16**	**20**
Double Drum	**3,926**	**1,963**	**70**	**18**	**12**
Triple Drum	**412**	**206**	**70**	**15**	**15**
Electric	**2,212**	**1,106**	**78**	**14**	**8**
Steam	**2,852**	**1,426**	**74**	**14**	**12**

in the summary was largely determined by the classifications on the reports.

Because the WPB survey includes such a large proportion of the total equipment now in the country and because a knowledge of its condition should be valuable (particularly in view of the general interest in repair parts) the reports have been summarized by WPB and the results are tabulated in this article. Mr. M. B. Garber, director of the Construction Machinery Division, Equipment Bureau, and Charles C. Antle of the Expediting Section have given Excavating Engineer editors background information which supplements a regular government press release on the subject of the amount and age of construction machinery in the country summarized above. This additional information also assists in evaluating the statistics furnished by the WPB and presented in this article.

The survey revealed that there are 450,000 pieces of construction machinery in the United States today, exclusive of construction-type equipment owned by farmers, the Army, Navy, Maritime Commission, War Shipping Administration, and that purchased for export outside the continental United States. The Construction Machinery Division believes that, outside the excepted groups mentioned, at least 95 per cent of the machinery owned in the country is now listed with the WPB. There are, of course, some small operators off in remote regions who are not registered. However, at the time the age analysis was made, the results of only about one-half the survey had been reported to the Construction Machinery Division. Of the approximately 450,000 pieces of construction machinery in the United States, minus the exceptions, the analysis by age was made of approximately 233,000 units.

The survey of construction machinery in the country was conducted in the following manner; the Construction Machinery Division, through the regional WPB offices, contacted manufacturers, equipment dealers, trade associations, etc., for lists of users of construction equipment and then sent Form WPB-1159 (reproduced on a following page) to the list of users obtained. Additional information was obtained later when Limitation Orders 1-53-b and L-192 were amended so that each construction equipment user had to certify when he purchased repairs for his equipment, that he had registered his equipment with WPB. This, of course, brought in additional names of users.

WPB has not broken down the

...ipment (Available and Unavailable)

PRODUCT	Estimated Total Units in U.S.A.	Total Units Tabulated	PERCENTAGE DISTRIBUTION BY AGE GROUPS: Prior to 1930 Percent	1930-37 Percent	1938-42 Percent
Hammers—Total	28,604	14,302	48	20	32
Jack Hammers	**25,312**	**12,656**	**46**	**20**	**34**
Pile Hammers	**3,292**	**1,646**	**63**	**18**	**19**
Loaders—Total	4,440	2,220	31	18	51
Front End Tractor	**1,940**	**970**	**19**	**15**	**66**
Miscellaneous	**272**	**136**	**37**	**17**	**46**
Portable Bucket (Other than coal)	**2,120**	**1,060**	**40**	**21**	**39**
Snow	**108**	**54**	**44**	**15**	**41**
Mixers—Total	40,886	20,443	39	24	37
Bituminous	**1,420**	**710**	**17**	**34**	**49**
Concrete	**32,312**	**16,156**	**45**	**24**	**31**
Truck	**7,154**	**3,577**	**15**	**22**	**63**
Mud Jacks	82	41	24	44	32
Paving Breakers	9,162	4,581	43	15	42
Plants—Total	5,526	2,763	41	22	37
Asphalt—Total	**996**	**498**	**45**	**20**	**35**
Ashphalt Portable	**568**	**284**	**44**	**24**	**32**
Asphalt Stationary	**428**	**214**	**47**	**14**	**39**
Batching	**1,362**	**681**	**46**	**26**	**28**
Concrete	**1,032**	**516**	**40**	**4**	**56**
Crushing	**1,222**	**611**	**34**	**32**	**34**
Screening	**338**	**169**	**35**	**30**	**35**
Washing-Screening (Portable)	**576**	**288**	**40**	**24**	**36**
Plows—Total	5,928	2,964	28	43	29
Miscellaneous	**5,190**	**2,595**	**28**	**45**	**27**
Snow	**738**	**369**	**31**	**27**	**42**
Pumps (power, portable)—Total	13,360	6,680	36	24	40
Centrifugal	**9,736**	**4,868**	**32**	**24**	**44**
Concrete	**990**	**495**	**40**	**19**	**41**
Diaphragm	**1,576**	**788**	**51**	**22**	**27**
Miscellaneous	**794**	**397**	**52**	**19**	**29**
Triplex	**264**	**132**	**49**	**44**	**07**
Road Discs	1,522	761	24	33	43
Road Forms	460	230	44	26	30
Rollers—Total	21,338	10,669	40	24	36
Pneumatic	**1,112**	**556**	**15**	**14**	**71**
Sheepsfoot	**4,452**	**2,226**	**22**	**15**	**63**
Tamping	**182**	**91**	**2**	**19**	**79**
Tandem	**5,290**	**2,645**	**47**	**20**	**33**
Three-Wheel	**10,302**	**5,151**	**48**	**30**	**22**
Rooters & Rippers	2,102	1,051	29	33	38
Scarifiers	740	370	58	25	17

PRODUCT	Estimated Total Units in U.S.A.	Total Units Tabulated	PERCENTAGE DISTRIBUTION BY AGE GROUPS: Prior to 1930 Percent	1930-37 Percent	1938-42 Percent
Scrapers—Total	13,448	6,724	26	17	57
Drag	**4**	**2**	**--**	**100**	**--**
Dump—Total	**9,846**	**4,923**	**25**	**15**	**60**
Bottom Dump—Total	**250**	**125**	**54**	**34**	**12**
Less than 2 yd.	**158**	**79**	**62**	**33**	**5**
Over 2 yd.	**92**	**46**	**39**	**37**	**24**
Front Dump—Total	**8,168**	**4,084**	**23**	**14**	**63**
2-8 yd.	**3,202**	**1,601**	**20**	**15**	**65**
8 yd. and up	**4,966**	**2,483**	**25**	**13**	**62**
Rear Dump—Total	**1,428**	**714**	**29**	**22**	**49**
Less than 2 yd.	**808**	**404**	**30**	**23**	**47**
Over 2 yd.	**620**	**310**	**28**	**21**	**51**
Fresno	**654**	**327**	**50**	**28**	**22**
Miscellaneous	**2,944**	**1,472**	**24**	**18**	**58**
Shovels—Total	21,256	10,628	37	30	33
Crawler—Total	**20,796**	**10,398**	**37**	**30**	**33**
⅛-⅝ cu. yd.	**7,972**	**3,986**	**31**	**35**	**34**
¾-1 cu. yd.	**6,866**	**3,433**	**44**	**25**	**31**
1¼-1¾ cu. yd.	**4,230**	**2,115**	**38**	**35**	**27**
2 cu. yd. and up	**1,728**	**864**	**37**	**21**	**42**
Truck—Total	**460**	**230**	**16**	**32**	**52**
⅜ cu. yd.	**270**	**135**	**11**	**39**	**50**
½ cu. yd.	**142**	**71**	**11**	**24**	**65**
¾ cu. yd.	**48**	**24**	**54**	**13**	**33**
Tractor (see Loaders)					
Street Sweepers	518	259	20	27	53
Towers—Total	338	169	69	16	15
Concrete Placing	**90**	**45**	**78**	**11**	**11**
Material Elevating	**248**	**124**	**65**	**18**	**17**
Tractors (Track-laying)—Total	71,868	35,934	23	32	45
10 to 25 H.P.	**6,408**	**3,204**	**31**	**36**	**33**
26 to 40 H.P.	**17,492**	**8,746**	**26**	**38**	**36**
41 to 60 H.P.	**19,676**	**9,838**	**25**	**36**	**39**
61 to 75 H.P.	**9,666**	**4,833**	**23**	**29**	**48**
76 to 100 H.P.	**18,626**	**9,313**	**14**	**22**	**64**
Tractor Attachments—Total	10,844	5,422	26	16	58
Angledozers	**1,520**	**760**	**18**	**15**	**67**
Bulldozers	**5,506**	**2,753**	**23**	**18**	**59**
Power Control Unit	**2,514**	**1,257**	**22**	**10**	**68**
Winches	**1,304**	**652**	**57**	**19**	**24**
Tractors—Wheel	7,064	3,532	29	24	47
Wagons—Total	2,462	1,231	24	26	50
Crawler	**1,290**	**645**	**28**	**36**	**36**
Rubber-tired	**1,172**	**586**	**19**	**15**	**66**

power necessary to do so. Nor has there been an opportunity to analyze and tabulate the additional cards representing some 217,000 units received after the survey was completed. However, based on all survey and research experience, it is quite certain that the percentage figures given in the age columns will be little changed by the analysis of the balance of the card records.

Excavating Engineer editors have added to the WPB tabulation (on preceding pages) an extra column indicating an approximate total of each type of machinery existing in the country. This total was obtained by doubling the number of pieces used by WPB in its analysis of age groups (about half the total finally reported). This column, headed, "Estimated Total Units in U.S.A." is not as accurate as the "Total Unit Tabulated" figure used by WPB for each type of equipment, for although the total of all equipment reported is about double the amount used in the age group analysis, it is not necessarily true that the total should be doubled for each type of equipment. In some cases the figure used by WPB might be representing the final total of all that type of equipment, while in other cases the WPB figure might represent only a third or less of the final total figure. This is because it is possible that certain types of equipment listed were generally owned by larger and more active companies who would be more likely to report to WPB early during the survey period and thus the earlier totals used in making the analysis would include all of this type of equipment. There would also be a differential in the total used by WPB and the estimated total where types of equipment required more frequent purchases of parts for repair. The purchase of repair parts would, of course, involve a prompt registration of the equipment.

The equipment represented in the survey is largely, but not entirely, used in the construction industry. All construction-type equipment listed in the survey was reported and carried in the WPB files as construction equipment, regardless of whether it was being worked in mines, sand and gravel plants, quarries, brick and clay pits, material yards, highway departments, or in industrial plants. The only exceptions to listing this equipment under the heading, "construction industry" was of machines owned by the armed forces, farmers, and unregistered machines not located through the survey.

For Victory
Put Idle Machines to Work

The purpose of the WPB survey reported here was to locate and put to work where it would do the most good to help win the war every idle piece of usable construction equipment in the country.

Mr. Charles C. Antle of the expediting section of the Construction Machinery Division of WPB says:

"We know that although construction activity in the United States is dropping off, large contractors have built up large fleets of equipment far above their peace-time inventories. Many of these machines are standing idle while there are thousands of individuals, industrial plants, municipal units, etc., urgently in need of this equipment.

"We feel that the contractors are holding on to their equipment in anticipation of a boom in construction at a later date. We would like to see this idle equipment sold on the open market so that the present-day users who really need such equipment could purchase it. There are objections to selling equipment, such as unpopular price ceilings, high income tax charges, etc. However, income tax charges are likely to get higher instead of lower. It is quite possible that if contractors do not move some of these unused machines now they will stand idle so long that their value will depreciate materially.

"There is a good used equipment market today if the contractor would only take advantage of it. By selling his idle machines, he would make a material contribution to the war effort."

Registration card used by WPB in making census. Reverse side of this card solicits information on needed repairs and job data.

FORM **WPB–1159**
(6-17-43)

UNITED STATES OF AMERICA
WAR PRODUCTION BOARD

Bureau of the Budget No. 12-R122
Approval Expires October 5, 1943

REPORT OF AVAILABLE CONSTRUCTION MACHINERY

Fill out and return one card for each piece of equipment within five (5) days of receipt direct to nearest WPB field office

AT–

Kind:	Type:			Owner:
Size:	Condition:	WPB No.:		Address:
Manufacturer		Serial No.:		Sales Price (as is):
Model No..	Year Manufactured:	Year Purchased:	(Check) ☐ New ☐ Used	Will Rent For— Day: Week: Month:
Powered by (check): ☐ Gas ☐ Diesel ☐ Electric ☐ Other ☐ None				Limitations:
Attachments:				
Estimated Cost of Needed Repairs, $				
State General Nature of Repairs:				Signed
				Date Title

Section 35 (A) of the United States Criminal Code, 18 U. S. C. Sec. 80, makes it a criminal offense to make a willfully false statement or representation to any Department or Agency of the United States as to any matter within its jurisdiction.

16—35909-1

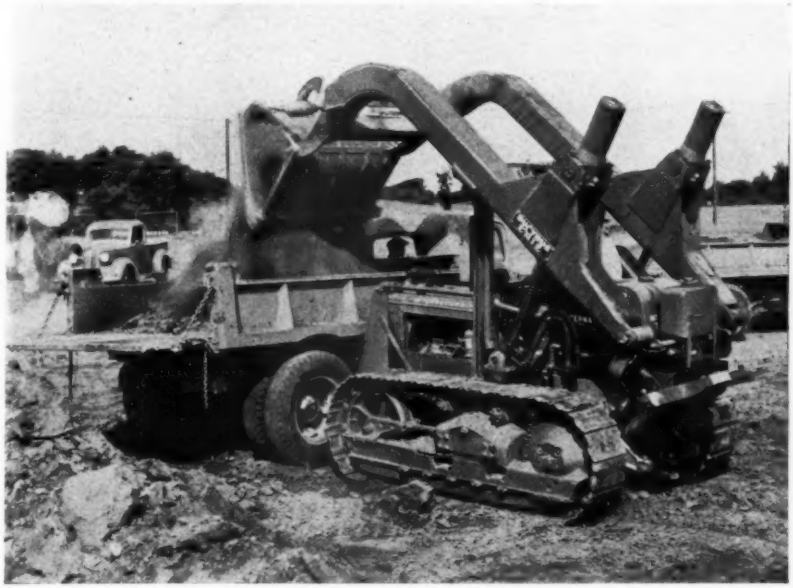
Equipment you ought to KNOW ABOUT

For further details about the equipment on these pages please write to the manufacturer, mentioning Excavating Engineer.

Dozershovel

Manufacturer: Bucyrus-Erie Co., South Milwaukee, Wis.

Claims: This two-in-one dirt moving unit for T9 and TD9 International TracTracTors gives full-fledged tractor-shovel and bulldozer service by simple interchangeability of bucket and blade.



As a shovel, the unit's hydraulic control provides down pressure up to 4200 pounds for real digging "bites" and big pay loads in a short distance of travel. The same control on the bulldozer provides easy penetration in hard materials and ability to hold the cut. Strong side arms permit the shovel to lift big loads and the dozer to handle any dirt-dozing job. The dumping trip-mechanism gives the ability to tip the blade forward to release the load on uphill dozing. Other features include unobstructed visibility, low overhead clearances, oscillating tracks, and quick, high lift. It's traveling height of only 8′ 1½″ allows it to get in and out of buildings, to work in close quarters. It has oscillating tracks for stability on uneven ground, and high lift for fast work in loading trucks.

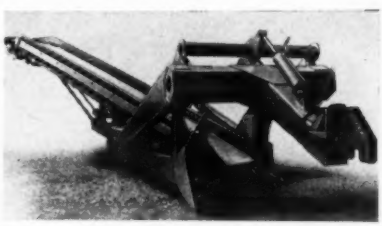
An additional feature is the standard hook on the upper edge of the shovel bucket or dozer blade, giving the unit a third application: lifting crane service. This is especially handy in loading or unloading the extra blade or bucket from the truck.

The changeover itself is a simple operation, only requiring the removal of five pins holding the bucket, trip latch, and limit chains: setting dozer blade or bucket in place, and replacing pins.

Euclid Loader

Manufacturer: The Euclid Road Machinery Co., Cleveland, Ohio.

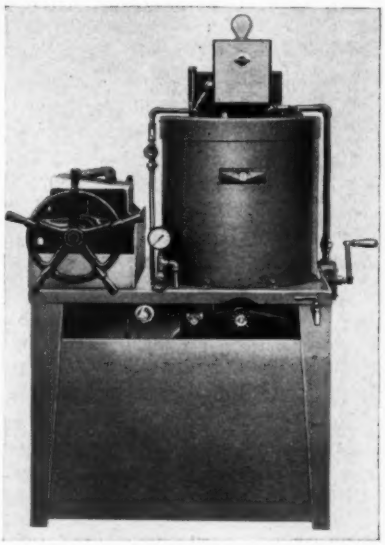
Claims: The Euclid Loader is a versatile loading tool that can be used efficiently on many types of earth moving jobs such as airports, flight strips, dams, highways, plant sites, and soil stripping. Some of its operating and performance features are: only one operator for both puller tractor and loader; hauling units loaded in shorter travel distance because of the wide cutting blade of the plow point, mold board and wide 54″ belt; works in narrow cuts, even with large hauling units; cuts through surface contours and leaves a clean smooth cut: has unusually long belt life and low maintenance cost.



Oil Reclaimer

Manufacturer: Youngstown Miller Company, Sandusky, Ohio.

Claims: A small capacity lubricating oil reclaimer, designed for organizations having their own fleet of trucks and motorized equipment. In addition to reclaiming lubricating oils of the motor fleet, the reclaimer can usually handle a limited quantity of waste lubricating oils drained from equipment. With a capacity for purifying eight gallons of dirty oil in 70 to 90 minutes, this Model A-8 Oil Reclaimer will handle 2500 gallons of waste lubricating oil per year when operated only once a day.



This machine has a two-stage filter press, is semi-automatic, operating under thermostatic con-

(Conutinued on page 618)

Oil from the Sands of Canada

Open pit methods used to mine fabulously rich McMurray oil sands in Alberta, Canada, may become greatest excavation project on the continent. Sands, estimated to contain 250 billion barrels of oil, cover an area from 10,000 to 30,000 square miles.

by WILL A. ROBERTSON

THE active participation of the Canadian Government in the development of the fabulously rich McMurray oil sands in the northern section of the Province of Alberta is the first long step toward what might eventually become the greatest excavation project on the continent. These sands, estimated by the U. S. Bureau of Mines to contain 250 billion barrels of fuel oil—enough to fill world requirements for 100 years—extend along both sides of the Athabaska River and its tributary the Clearwater, and cover an area estimated variously as between 10,000 and 30,000 square miles, with Fort McMurray as a focal point.

The existence of these oil sands has been known for 150 years but inaccessibility and cost of development has hindered extraction of the oil on any important scale. Now, with the proximity of the area to the Alaska Highway and gradual lessened production from world oil pools, combined with the great wartime need for oil, the picture is changed dramatically.

The oil sands, although occurring in some instances in outcroppings up to 200 feet in height, lie under seven to 50 feet of overburden and extend to a depth of about 200 feet in the more richly impregnated areas. Outcroppings emanate a strongly asphaltic odor, vary in color from dark brown to black and display occasional streaks of bitumen on the face where small quantities of the material have worked to the surface. A difference to the eye is apparent between the beds of highly infiltrated sands exposed in great cliff-like out-croppings and the lean beds and layers of silt and clay forming the gentler slopes. Well-impregnated sand is a compact material. A small bit of it may be crumbled in the hand into a disintegrating mass and close examination of the material shows it to be composed of white sand particles, each coated with a sticky film of bitumen. Uniform saturation is the rule in a few areas, but, generally, the richest formation is the closest to the base of the bed. Oil content has been shown to vary by weight from zero to 24 per cent, and oil is estimated in some sectors to be pres-

• The outcrop of oil sands of the McMurray area in northern Alberta, Canada, vary in color from dark brown to black and have a strong asphaltic odor. The sand composition is easily pricked by a sharp tool but resists heavy blows.

• Oil sand is being stripped in benches. To the right is a bench of unstripped oil sand, in the center the oil sand has been stripped of overburden and to the left is a pit from which the oil sand has been excavated. A bulldozer, in the pit, and power shovel, center background, were used in the stripping operations. Part of the tank "farm" can be seen in the extreme left background just behind the loading platform and conveyor belt. Other camp buildings seen in the picture include the machine shop, bunkhouse and cookhouse.

ent in quantities of 100,000 to 125,000 bbls. per acre. Asphalt recovered has shown a high degree of ductility.

Two Small Plants

Two small plants with accompanying workings are at present located in the area; that of Oil Sands Ltd. (which plant was purchased in June by this newly-formed company from International Bitumen Co. Ltd.) and that of Abasand Oils Ltd., which has been taken over for the duration by the Dominion Government, through the Department of Munitions and Supply, and the Oil Control Office. It will be enlarged under a $500,000 appropriation into an experimental pilot plant for the prime purpose of investigating the economics of recovering petroleum and its products from the oil sands. Everything from bunker oil, including the kerosene categories, to the highest octane ratings can be produced. However, the very quality which makes for perfect asphalt also renders the crude useless for the manufacture of lubricating oil. It never has been subjected to the tremendous pressures to which deep-well crudes have been subjected and it is very susceptible to heat and therefore it cracks down at relatively low temperatures. On the other hand, this quality makes possible the manufacture of all types of fuel which require a low flash point.

The Oil Sands plant, shut down for some months, has now resumed operations under the new management. Abasands plant is at present being completely rehabilitated by the Government and advanced engineering principles are being worked into the excavating - extracting - refining process to develop the general working technique to as near perfect as possible.

The Abasands operation was begun in 1936. The actual excavation of the oil-bearing sands was foremost of many problems confronting the company. The material had to be broken down to be handled in the separation plant in which the oil was removed from the white sand by means of a flotation process. It could not be fed into the plant in large quarried blocks. Heavy blasting was found to distribute the material too widely and the oil was found to be too compact to allow the oil to be washed out hydraulically.

However, after many months of study and experiment, a method of mining the material was evolved. Open-pit mining methods were used. The overburden was stripped by power shovel and bulldozer. Shot holes were then sunk to distances averaging roughly 20 feet in depth by means of steam-jetting through a one-inch pipe flattened to a nozzle at the lower end. Light shots of blasting gelatine loosened the material. A power shovel loaded the loosened oil sand into trucks and it was hauled to a loading platform where it was dumped onto

(Continued on page 620)

• Drilling for blasts that loosen the oil sand is done by steam-jetting through a one-inch pipe flattened to a nozzle at the lower end. Holes average 20' in depth and drilling time, including moving and setting up, is about a foot a minute.

ANCESTORS

Century-old English patents for excavators and pile drivers employ methods used on some modern machines of these types.

SEVERAL OF THE ideas employed in some of our modern excavating equipment, as well as in pile drivers, can be traced back to England in the days of Queen Victoria. Almost 100 years ago, on March 14, 1849, two English engineers, Thomas Clarke of Hackney and Thomas Motley of Bristol, were granted patent rights on certain improvements in obtaining and applying motive power, in railroads and other roads, and in supporting pressure, resisting strain, and protecting against fire.

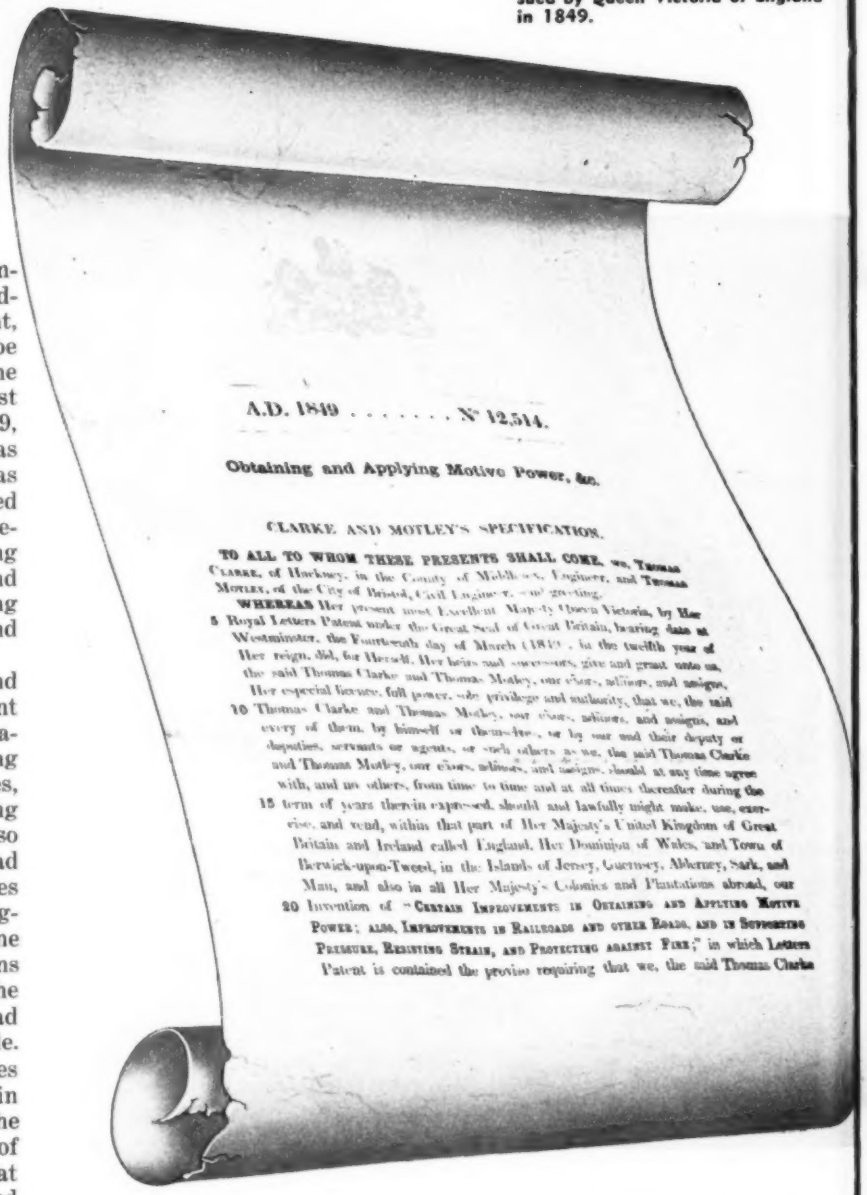
Included in the drawings and descriptions submitted for patent rights were three of novel excavating machines. The digging attachments of these machines, as well as the elevated loading platforms, could be revolved so that material immediately ahead of the machine and on both sides could be excavated without changing the position of the machine proper. The revolving platforms of these machines also enabled the operator to dump his load ahead of the machine, or on either side.

One of the excavating machines patented required manual aid in dumping the shovel's load to the elevated platform. Another of the machines was so equipped that the shovel's load could be dumped automatically. These two machines had a single digging shovel that could, however, be exchanged with two special cutting tools that were suggested for use when the material to be excavated was too hard for the shovel to handle. The English inventors described the special cutting tools as having an action, "similar to a pickaxe."

The third excavating machine patented by Clarke and Motley had three digging attachments, a shovel and two special cutting tools to loosen the material for loading in the shovel, on the same rotary attachment. This machine was also provided with a platform that could be tipped for loading the excavated material into carts. Apparently, the unloading of the platforms of the other two machines patented by the two English engineers was to be a manual process.

Among the several ideas patented by Clarke and Motley in 1849 that would be of interest to the modern excavating engineer and contractor, in addition to their excavators, were their adoption of steam or compressed air to the operation of pile-driving machines. The accompanying drawings picture the operating principles of these pile-driving machines.

• Reproduction of the first page of Clarke and Motley's patents issued by Queen Victoria of England in 1849.



A.D. 1849 . . . . . N° 12,514.

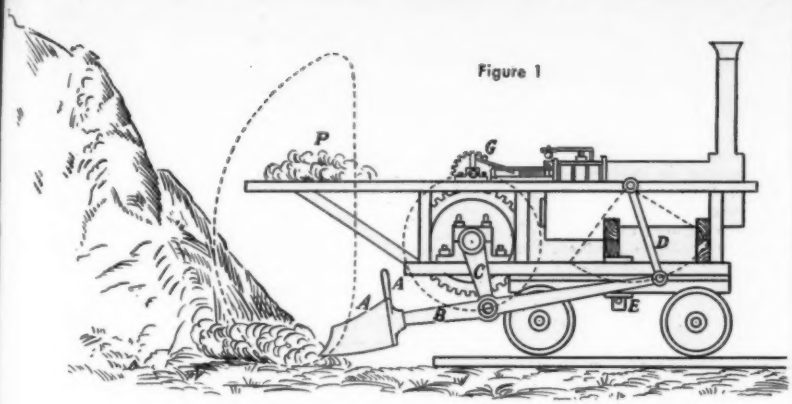
Obtaining and Applying Motive Power, &c.

CLARKE AND MOTLEY'S SPECIFICATION.

TO ALL TO WHOM THESE PRESENTS SHALL COME, we, THOMAS CLARKE, of Hackney, in the County of Middlesex, Engineer, and THOMAS MOTLEY, of the City of Bristol, Civil Engineer, send greeting.

WHEREAS Her present most Excellent Majesty Queen Victoria, by Her Royal Letters Patent under the Great Seal of Great Britain, bearing date at Westminster, the Fourteenth day of March (1849), in the twelfth year of Her reign, did, for Herself, Her heirs and successors, give and grant unto us, the said Thomas Clarke and Thomas Motley, our exors, admors, and assigns, Her especial licence, full power, sole privilege and authority, that we, the said Thomas Clarke and Thomas Motley, our exors, admors, and assigns, and every of them, by himself or themselves, or by our and their deputy or deputies, servants or agents, or such others as we, the said Thomas Clarke and Thomas Motley, our exors, admors, and assigns, should at any time agree with, and no others, from time to time and at all times thereafter during the term of years therein expressed, should and lawfully might make, use, exercise, and vend, within that part of Her Majesty's United Kingdom of Great Britain and Ireland called England, Her Dominion of Wales, and Town of Berwick-upon-Tweed, in the Islands of Jersey, Guernsey, Alderney, Sark, and Man, and also in all Her Majesty's Colonies and Plantations abroad, our Invention of "CERTAIN IMPROVEMENTS IN OBTAINING AND APPLYING MOTIVE POWER; ALSO, IMPROVEMENTS IN RAILROADS AND OTHER ROADS, AND IN SUPPORTING PRESSURE, RESISTING STRAIN, AND PROTECTING AGAINST FIRE;" in which Letters Patent is contained the proviso requiring that we, the said Thomas Clarke

Figure 1

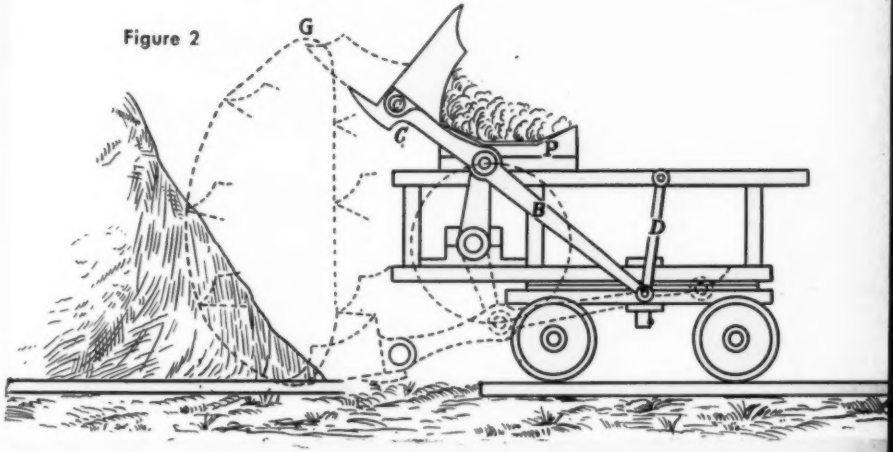


• A side elevation of a proposed steam-powered excavating machine at work. By the revolution of crank "C", the shovel "A" is put into the motion indicated by the dotted lines. The shovel is not rigidly fixed to the bar "B", but turns on an axis so that when the shovel is at its highest point it is turned over by a man by means of the handle "A", and its contents emptied on platform "F".

The boiler for supplying steam to work a steam cylinder and pinion "G" is fixed on the frame of the excavating machine.

The entire machine, including the steam boiler, turns horizontally on a center "E", thereby enabling the cutter to excavate immediately ahead of it and on each side before it receives the next progressive forward movement.

Figure 2



• Another modification of the mode of delivering the earth to the platform, "P". On this machine the shovel is attached to bar, "B", by a vertical joint, "C". When the shovel is raised to the highest point, "G", the momentum of the shovel and its load of earth throws it forward to the position shown in this drawing and spilling the load onto the platform.

Figure 3

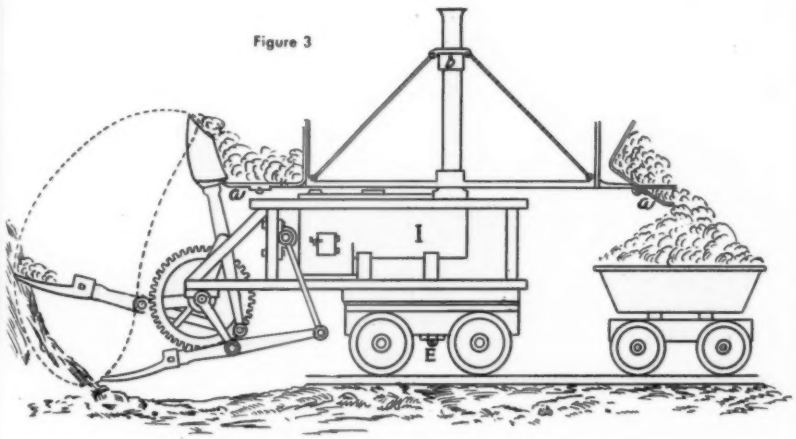
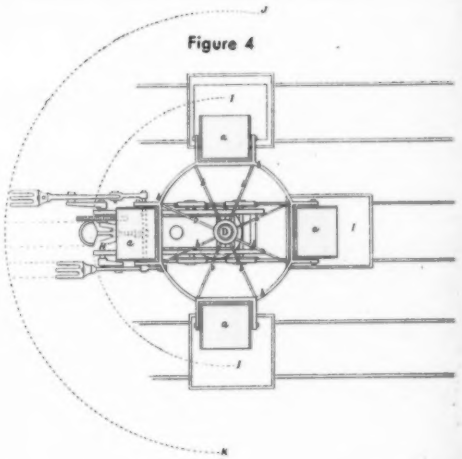


Figure 4



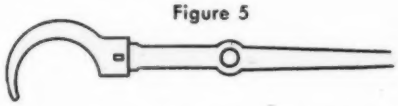
• A side elevation of a more highly developed machine proposed for railway cuttings and other similar work, showing a mode of delivering earth into carts.

The horizontal plan of the machine, to the right, indicates its operating principles. "H", is a three-throw crank, with shovel attached to the center crank and outside cranks working other varieties of cutters (Figs. 3 and 4) for breaking up the ground for the shovel. At the top of the excavator the horizontal beds or platforms, "a,a,a,a," receive the earth from the shovel. These platforms turn upon joints or hinges by which they are attached to a framing "b,b,b,b," which can be revolved horizontally around the chimney of the engine, "D". Through the revolving of the framing around the chimney, the earth can be brought to carts "I,I,I" into which it is emptied by tipping the platform, "a,a,a,a".

The engine and cutters can revolve from the center to position from "J" to "K", independently of the revolving of the platforms, and thus break up the ground on either side for the shovel.

The earth is thrown on the revolving platform by its momentum, when the motion of the shovel is immediately reversed.

Figure 5



• Other varieties of diggers or cutters to be exchanged with the shovel shown on the machines whenever the ground may require it. These cutters were designed to break up the ground in the manner of a pickaxe.

Figure 6

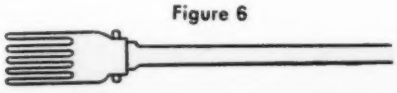


FIGURE 1A

● Vertical view of Clarke and Motley's pile driving machine including a section view of cylinder for working the parts. "A" is a wrought iron vacuum cylinder, closed at the bottom and open at the top. The cylinder has an air-tight piston and self-acting slide gear. A pulley, "B", is fixed to the top of the piston and rises and falls with it.

A chain or rope is attached at one end to the rammer and is then passed over the pulley on the top of the machine, and then under pulley, "B", then over the fixed pulley, "C", and is then passed down under the bottom of the frame and brought up and affixed to the head of the pile.

The power for the pile driver is derived from a steam engine, or other prime mover, fixed at any convenient spot, which works an air pump for producing the exhaustion. Small wrought iron tubes connected by flexible joints of vulcanized india rubber provide communication between the air pump and the pile driving machine.

The mode of action for this pile-driving machine is as follows: assuming the ram is down on the pile head, and the piston, consequently, at the top of the vacuum of the cylinder, communication is opened by the valve gear with the air pump. Exhaustion then takes place in the cylinder, the piston descends by the external pressure of the atmosphere and raises the ram. When the piston arrives at the bottom of the cylinder, the valves reverse themselves, and communication with the air pump is then shut off, and the external air is admitted under the piston. Equilibrium now being restored, the ram falls with the full effect of gravity on the pile, the valves are again reversed, and the same operation is repeated. Thus, a succession of short heavy blows are given rapidly, in proportion to the power of the steam engine. By this arrangement of the pulleys, the distance between the pile head and the face of the ram is always the same.

FIGURE 2A

● A vertical section of a pile engine to be worked by steam pressure. The steam cylinder is fixed in a vertical position at the bottom of the frame, the steam acting on the top of the piston. The piston rod is attached to a rod, "D" to which is fixed a pulley, "E". One end of a rope or chain is made fast to the frame at "F", passes under pulley "E" and over the fixed pulley "G" on top of the engine. To the intent of this chain is suspended a pulley, "H", over which a second chain passes, one end of which is attached to the ram, and the other, passing down under the bottom of the frame, is brought up and affixed to the head of the pile.

By this arrangement of pulleys the piston moves through only one-fourth the space of the rammer and consequently with only one-fourth of the speed of the rammer in falling; therefore all injury to the piston is prevented by being drawn up by the fall of the ram. A crab engine is fixed to the bottom of the frame, worked by a small oscillating steam cylinder for raising the pile into its place.

FIGURE 3A

● In this drawing the steam cylinder is fixed horizontally to the bottom of the engine. Fixed on a separate frame, the steam boiler is connected to the steam cylinder by a jointed pipe. A chain shorter than the pipe is connected between one end of the boiler and the pile engine frame to prevent the pipe from being ruptured in shifting the machine. The steam pipe is made with universal joints to allow the pile engine to be moved a given distance without moving the boiler.

FIGURE 4A

● Transverse vertical section of the frame and steam cylinder.

FIGURE 5A

● Horizontal plan of the pile engine showing position of steam engine.

Figure 1-a

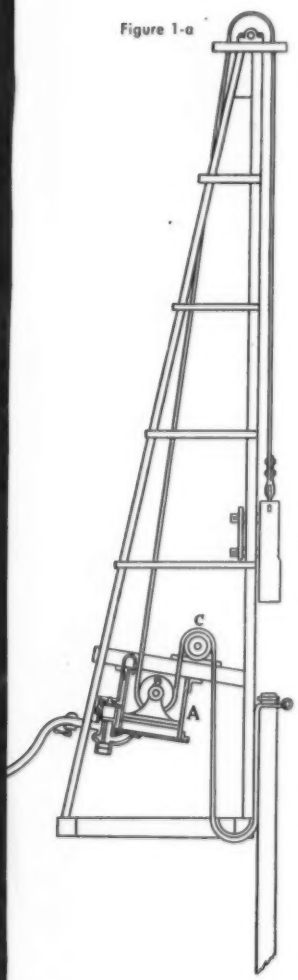


Figure 2-a

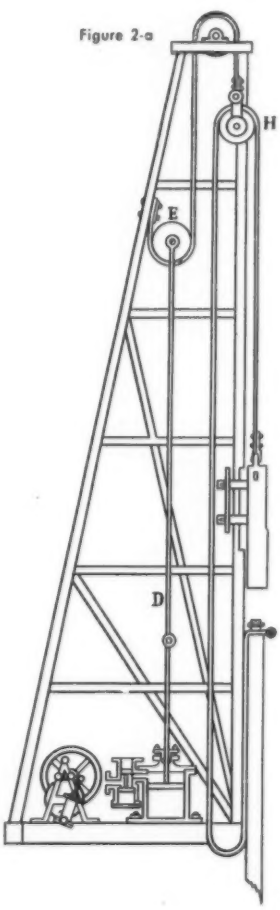


Figure 3-a
Side elevation of Pile Engine

Figure 4-a
Horizontal plan of frame

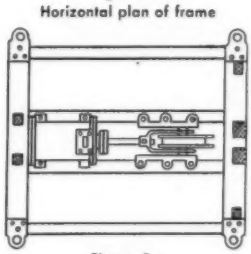
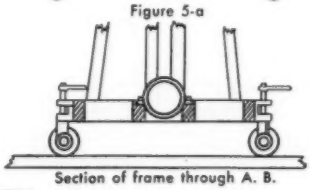
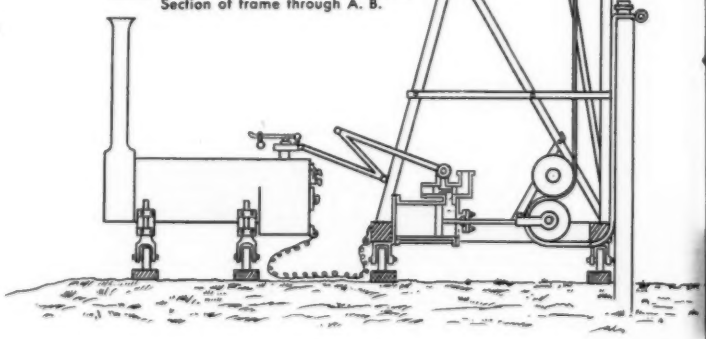


Figure 5-a



Section of frame through A. B.



Mister, you're mighty lucky to have those TWINS*

*"Caterpillar" TWIN Services

AND we are justifiably proud to be their Papa! They'll serve you well with a minimum of care and cost. We saw to that in the beginning.

TWIN Number One is called "Factory Built-in Service." His very important brother is "Dealer Quality Service." Together, they bring vigorous, dependable, year-round PERFORMANCE from your "Caterpillar" Diesel equipment.

For example, Number One represents "Caterpillar's" basic engineering skill and precision workmanship which have given you

(a) *Simplicity of operation.*
(b) *The ability to work in any climate, on any job.*
(c) *The ability to burn a wide variety of fuels.*
(d) *Proved—again and again—dependability.*

Number Two—"Dealer Quality Service"—offers you

(a) *Factory-trained service men.*
(b) *Modern shops.*
(c) *Special tools.*
(d) *Money and metal saving repair methods.*

This particular "TWIN" is vitally essential to you right now. Make it a point to see him regularly!

There is scarcely a "Caterpillar" Diesel Tractor, Motor Grader, Engine or Electric Set—regardless of age or usage—that hasn't a lot of dependable working hours left in it. "Dealer Quality Service" will help you keep it on the job.

REMEMBER

THE FIGHTING FOUR

INSPECT. Look your equipment over frequently. For expert "internal" inspection, call in a trained "Caterpillar" Service Man. Read your Operator's Instruction Book.

LUBRICATE. Use the right oil at the right time in the right place and in the right quantity. Keep it clean and replace before it deteriorates.

ADJUST. Tighten all bolts. Keep valves and clutch in proper adjustment. Read the Operator's Instruction Book.

REPLACE. Have "Dealer Quality Service" recondition or replace worn bearings, cylinder liners, clutch linings and other parts vital to restored power and extended engine life.

CATERPILLAR DIESEL

REG. U.S. PAT. OFF.

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS

TO WIN THE WAR: WORK—FIGHT—BUY U. S. WAR BONDS!

Shots from the FIRING LINE

Ten Per Cent Decline in Construction Volume

The total volume of construction activity in the United States in August was $601,381,000, the War Production Board announced. This was a 10 per cent decline from the July level and a 59 per cent drop from the peak monthly activity of the war construction program.

The current August volume was but a fraction of one per cent under the schedule for the month. An 11 per cent decrease is expected to be shown in the September figures, bringing the third quarter volume to $1,510,000,000, or less than half the $4,254,000,000 peak volume of the third quarter of a year ago.

War housing and community-facilities construction remained virtually at the July level, with privately-financed housing increasing by five per cent, and government-financed housing declining by nine per cent.

Expansion of government-financed industrial facilities (construction volume and machinery and equipment deliveries combined) in August was $321,702,000—15 per cent below the July level and two per cent under the schedule. Factory construction declined 24 per cent and amounted to $131,013,000—virtually fulfilling the scheduled $130,450,000. Machinery and equipment deliveries during the month totaled $190,689,000, eight per cent less than the July rate and four per cent below the August schedule.

Allowed Use of MRO Symbol

Persons engaged in the manufacture of light-weight aggregates, ready-mixed concrete, and pre-mixed bituminous concrete are eligible to use the MRO symbol and the AA-2 preference rating assigned by CMP Regulation No. 5 to obtain maintenance, repair and operating supplies, the War Production Board said.

This clarification, contained in Interpretation 10 to CMP Regulation No. 5, indicates that these items are included within the scope of the term "products for structural use not elsewhere listed" which appears in Schedule II of the Regulation and which indicates businesses which may use the AA-2 preference rating.

Five Companies Develop New Alabama Bauxite

Following the discovery of important new reserves of bauxite in Alabama by the Bureau of Mines and the Geological Survey, five private companies already have begun commercial development of eight of the deposits.

A total of 33 new bauxite deposits have been explored in the Eufaula district of Henry and Barbour counties in Alabama as a result of the expanded program of the two Interior Department agencies and additional reserves are being discovered nearly four times as fast as the bauxite is being mined.

Because of the rapid commercial

• Bucyrus-Erie 20-B clamshell in the foreground and the Koehring to the left are working at Selfridge Field, Michigan, loading sand to a hopper and to railroad cars—Air Corps Photo.

For Better Winter and Wet Weather OPERATION OF TOURNAPULLS . . .

Tournapull with a load of material to spread over an icy, slippery spot.

Give Drive Wheels a Grip by Reducing Slippery Spots . . . You'll Save Vital Rubber, Move Bigger Loads Faster

EXTRA TRACTIVE POWER is built into Tournapulls by:

1. Centering weight on the drive wheels.
2. Use of extra-large diameter tires.

This *extra tractive power* enables Tournapulls to haul over soft, slippery spots that stick ordinary equipment. But, to take full advantage of this extra traction, keep your haul roads free from the slippage that's bound to result on icy, muddy surfaces.

INCREASE TIRE LIFE—Slippage—whether from wetness, mud or ice—slows travel speed, usually reduces the load you can haul, wears off rubber and increases the danger of tire cuts. To lengthen tire life and get top speed and top yardage, give Tournapull drive wheels a slip-free surface that puts all your tractive power to work.

SAND ICY ROADS—If your haul road is icy, pick up a Tournapull load of sand or cinders and spread it in a thin layer over the icy section.

AFTER QUICK SHOWERS—When a quick shower wets the top inch or so of your haul road so it's "slick as glass," get some dry material out of the cut and spread it over the roadway. If the haul is too long to do this quickly or the wetness goes down 3 or 4 inches, scrape it off with a Tournapull, Dozer or motor grader.

MUCK OUT SOFT SPOTS—When slippage occurs in soft spots, muck 'em out with a Tournapull or Dozer. After mucking out, fill in with dry dirt from the cut. Remember the size of your load is determined by what you can haul through and over slippery places. Make it big by cutting out slippage. You'll find it pays.

DEALER SERVICE PAYS, TOO—Tournapulls are stoutly constructed to cut lost time to a minimum. The best of equipment, though, requires repair occasionally. Then you'll find quick, expert service available from 183 LeTourneau-"Caterpillar" dealers and branches in the U. S. Use it to keep your equipment operating at top efficiency NOW.

Tournapulls are designed to walk out of troublesome soft spots, but they move bigger loads faster over good winter haul roads like this. Good drainage pays profits.

R. G. LE TOURNEAU INC

ARMY NAVY

PEORIA, ILL. — STOCKTON, CALIF.

Manufacturers of Dozers, Carryall* Scrapers, Power Control Units, Rooters*, Sheep's Foot Rollers, Tournapulls*, Tournarope*, Tourna-Trailers*, Tournaweld*, Tournacranes*. *Trade Mark Reg. U. S. Pat. Off.

utilization of the deposits, the exploratory program can be considered self-sustaining, Secretary of the Interior Harold L. Ickes stated, since the income taxes to be paid by property owners on royalties, the corporate taxes of the producing companies, and the income taxes of employees, will return more to the Government than the costs of the drilling program. Property owners are said to receive royalties from lessee and mining companies ranging from 50 cents to $1 per ton of bauxite.

The five mining companies already have shipped 40,300 tons of bauxite. The eight deposits contained a total of about 179,000 tons of marketable-grade material, which, however, is a small fraction of domestic production. Overburden; or soil, has been removed from an additional 104,000 tons, leaving 34,700 tons in reserve for future operations.

Estimates of the Bureau of Mines and the Geological Survey place the total amount of bauxite material in the 33 newly-discovered deposits at 1,680,000 tons, including 352,800 tons of commercial-grade bauxite. Most of the bauxite is in numerous small deposits under shallow overburden which can be removed easily. The exposed bauxite then is mined by open-pit, or stripping methods.

As a result of the Bureau's intensive exploratory program for the ores of aluminum in the United States, the known reserve of domestic bauxite of all grades have been increased by several million tons of which only a small percentage can be used in existing plants, and those of alumina-bearing clays be more than 100,000,000 tons.

Bureau officials said that the use of two-auger-type power drills has reduced drilling costs in the Alabama bauxite exploratory work to about 40 cents per foot for the 2,000 holes which have been drilled for a total distance of 100,000 feet. The drills are capable of boring from three to five 50-foot holes in eight hours. Over all costs of the exploratory work, including supervision, has been about 2.4 cents per ton of all grades of bauxite or 10.4 cents per ton of the present commercial grades.

Dr. R. R. Sayers, Director of the Bureau, said that the power auger-drills employed by the Bureau's exploratory crews previously had been used only for the shallow prospecting of coal, but that they proved to be "rapid, efficient, and economical" in the Eufaula district. The drills are mounted on trailers, are self-contained units, and can be moved quickly from one area to another.

Work in the Eufaula district began in November, 1942, after an examination of the area had been made by the Geological Survey. The Bureau's drilling started in favorable areas outlined by the geological study. Prior to the exploratory program the producing companies were mining bauxite at a rate faster than new reserves were being discovered and output of bauxite from the area theatened to end, according to a report from R. W. Smith, district engineer of the Bureau in Alabama.

Southwest Cities Plan Post-war Airports

By F. N. HOLLINGSWORTH

Three of the largest cities in the Southwest have announced elaborate public works programs for postwar development. Two of them are concentrating on airport development, and the third, Houston, has outlined a $10,000,000 park and playground improvement project.

Dallas is planning to build a system of 21 landing fields. The program is part of a master plan for the city suggested by Harland Bartholomew, city planner of St. Louis. It calls for a super-port, a second field of major size, eight fields for helicopters and several smaller airports located strategically near important highways entering the city. In addition the development plan calls for parks, traffic ways and the city's civic center at Fair Park, all of which will involve a vast amount of excavation, grading and general construction work.

Oklahoma City plans the expenditure of $25,000,000 to improve airport facilities, with a combined freight and passenger air terminal, able to take care of the largest planes for years to come. The site will total 1,890 acres. The city already owns a large part of this land and has money on hand to ac-

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Years of research and practical field experience are incorporated in their design. Skilled workmanship, developed through long experience, is the keynote of their manufacture. Careful selection, based on testing in our modern metallurgical laboratory, assures highest quality materials. The combination of these features makes Bucyrus-Erie drill tools and supplies your key to savings in time and money.

Try Bucyrus-Erie blast hole drill supplies — bits, stems, jars, wrench, and other items — to speed up your drilling.

M-12

PROTECTION
to insure continuous service

Through American ingenuity and foresight troop movements are now protected from serious dive bomber attacks through the use of small captive balloons.

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3-WAY SERVICE
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Here is a PROVED better, faster, more economical service plan. By handling the hauling of your own outfit to and from the dealer's shop... you save time waiting for it to be picked up and delivered. You cut the cost of repairs, too... by having your operator bring in the machine. He can "pitch in" and help speed the job along... and learn plenty about the care and maintenance of the outfit. He can also act on your behalf when unforeseen problems arise.

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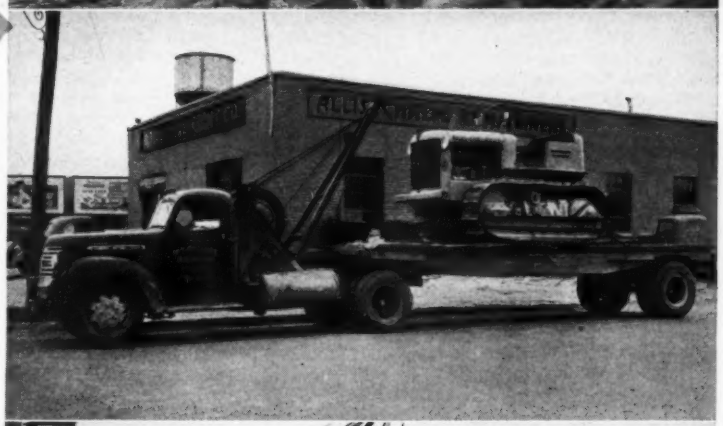
At all times your Allis-Chalmers dealer has gone "over-board" to serve you. Even under wartime conditions he is doing *a mighty fine job.* Unusual war demands may sometimes prevent his giving you the usual pick-up service... but rest assured he will do his best. It will help if you can anticipate your needs — let him know ahead of time approximately when you want him to call for your outfit. If it is at all possible, he will be there. Be sure to instruct him clearly as to what you want done... and your unit will be repaired exactly as you want it.



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You'll find your Allis-Chalmers dealer well equipped for field repairs. His service cars have time-saving tools for every emergency... operated by field mechanics highly skilled in their work. After a diagnosis of the trouble... your unit will be quickly put back in operation if it is only a matter of making adjustments or minor repairs. When major repairs or a complete overhaul are necessary it is best to have the work handled in the dealer's shop — where the necessary parts and proper tools are available.

• • •

No matter which of the three ways you want your repairs handled, you'll find your Allis-Chalmers dealer fully cooperative. It will pay you many times over to deal with him — for high quality work, quick service and greater economy.

ALLIS-CHALMERS

TRACTOR DIVISION • MILWAUKEE, U.S.A.

JOIN THE INVASION... BACK THE ATTACK... BUY MORE WAR BONDS

• International TD-18 tractor with Bucyrus-Erie scrapers at work on the Alaskan Military Highway near Whitehorse, Yukon Territory, some 500 miles south of the highway terminus at Fairbanks.

quire additional land without a bond issue.

At Houston, the master plan includes several parkways, an amphitheater and $3,000,000 worth of new neighborhood parks and playgrounds, together with $200,000 for esplanade improvement.

Oklahoma City's airport will have 18-inch thick concrete main runways 11,000 feet long and 500 feet wide. Dallas super-airport runways will be 10,000 feet long, with provision for extension to 15,000 feet.

WPB Order Standardizes Jack Sizes and Models

The War Production Board issued an order simplifying and standardizing the models and sizes of mechanical, hydraulic, air and electrically operated jacks. The Automotive Division of the WPB, under whose jurisdiction this new order, L-322, will be administered, will thus reduce the number of jack models from 403 to 225 and the number of sizes from 1825 to 864. There are approximately 40 jack manufacturers in the industry with an annual dollar sales volume of approximately $30,000,000.

Two new schedules of permitted models and sizes are included in the order, which restricts manufacture after November 1, 1943, to the simplified and standardized capacities, sizes and models set forth. In order to ensure equitable distribution to essential civilian users, it is also ordered that 25 percent of each month's non-military production of 3, 5, 8, 13 and 20 ton portable, upright hydraulic jacks is to be set aside and held available for delivery against orders rated on forms WPB-541 and WPB-547.

Dredge Los Angeles Opens Bay to Deep Water Shipping

By HELEN COMBS

The South Bay of San Diego harbor is now open to deep water shipping as the result of the harbor's last major dredging project. About 4,500,000 cubic yards have been removed from the South Bay area by the dredge Los Angeles, according to a report by William T. Osgood, resident manager of the Standard Dredging Company.

The dredge will be towed to Long Beach, where 5,000,000 cubic yards of material will be dredged from the mouth of the Los Angeles River to reclaim 10,000 feet of ocean shore line between the Rainbow and Belmont piers.

Fayal No. 2 Pit to be in Production in 1944

Fayal iron property No. 2 at Eveleth, Minnesota, will become a producer in the 1944 season. The property will be stripped this winter by the Oliver Iron Mining Co., subsidiary of the U. S. Steel Corp.

The maximum depth of overburden on this 25 acres is from 60 to 70 feet. The mine will be operated by the truck method and some rearrangement of the railroad tracks of the Duluth, Mesabi & Iron Range Railway will be necessary to serve No. 2 pit most efficiently.

The Fayal property as a whole is one of the veterans of the Mesabi range and was originally developed by shafts. It was one of the first iron mines on the Mesabi range to produce and forward 1,000,000 tons in a single season.

Bay State Plans 200 Million Post-war Program

By BETHUNE JONES

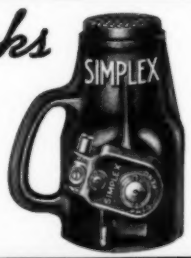
Massachusetts is planning the construction of nearly $200,000,000 of transportation facilities in the immediate post-war period, it was revealed by State Public Works Commissioner Herman A. MacDonald in an address Nov. 8 in Boston before the Associated General Contractors of Massachusetts.

Main phase of the projected program would be the expenditure of approximately $150,000,000 for 450 miles of new highways and 150 bridges.

The program also would include reconstruction of the Mystic piers in East Boston, now owned by the Boston & Maine Railroad, for which the Massachusetts Legislature in 1941 authorized a bond issue of $4,700,000. In addition, MacDonald said, it is quite possible that we may expend from $5,000,000 to $10,000,000 for additional pier facilities."

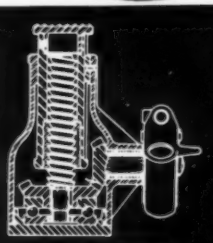
Also planned is the enlargement of Logan Airport, East Boston, into what will be "really one of the great airports of the country." Although not in-

Simplex Journal Jacks
for Stability
on Heavy Lifting!



15, 25, 35 and 50-tons capacity. 10" high, 5" lift; (50-ton has 4" lift).

The low height, wide bearing area, broad corrugated cap and base, and powerful mechanism of these jacks provide for safest possible lifting of buildings, machinery, bridges, etc. with speed. Lowest jack in height for its capacity.



Templeton, Kenly & Co., Chicago (44), Ill.
Better, Safer Jacks Since 1899

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LEVER - SCREW - HYDRAULIC
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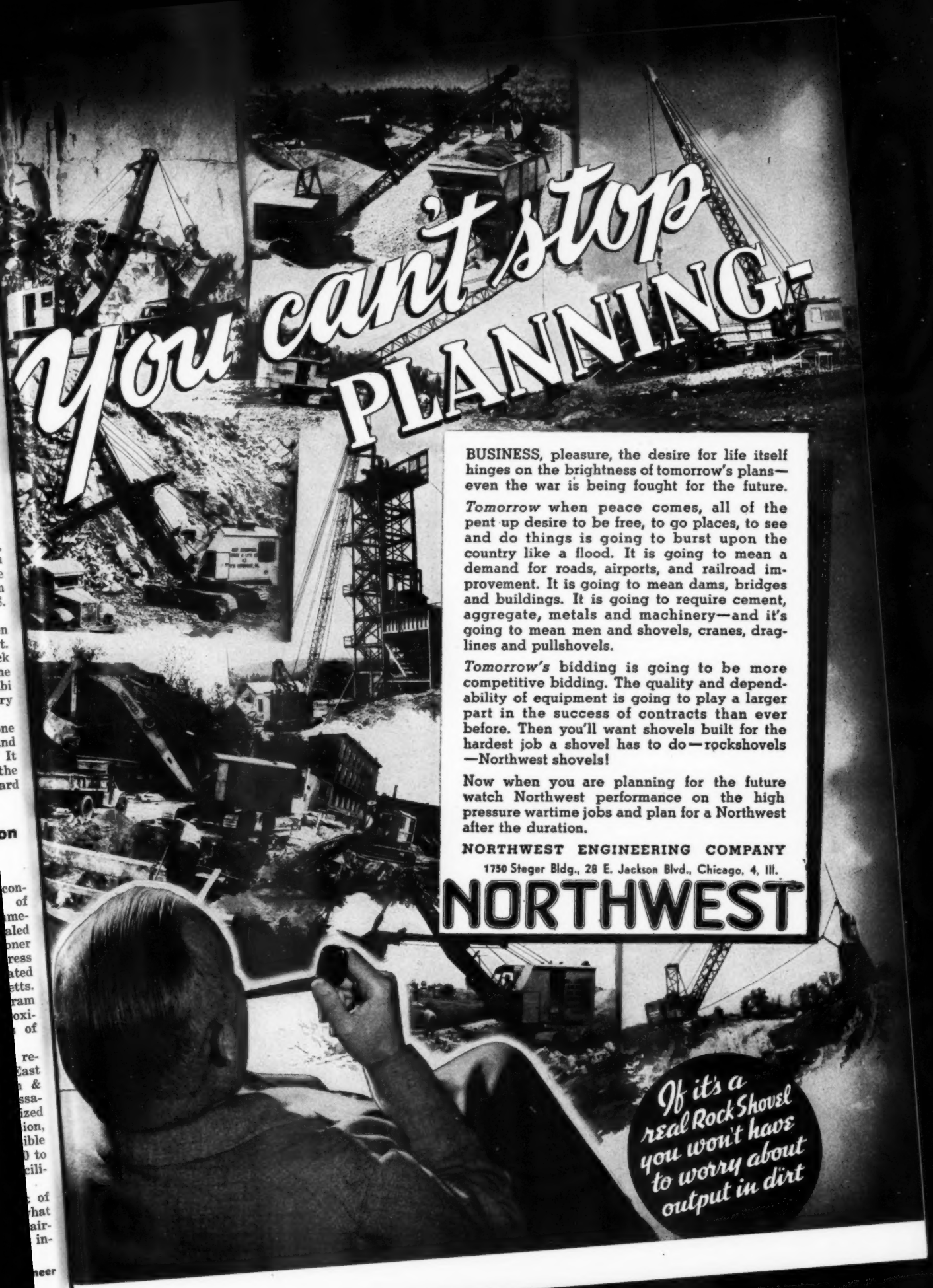
Speed War Construction Jobs with Simplex Jacks, Trench and Timber Braces and Pipe Pullers and Pushers. Ask for Bulletin "Ind-42."


You can't stop PLANNING-
BUSINESS, pleasure, the desire for life itself hinges on the brightness of tomorrow's plans—even the war is being fought for the future.
Tomorrow when peace comes, all of the pent up desire to be free, to go places, to see and do things is going to burst upon the country like a flood. It is going to mean a demand for roads, airports, and railroad improvement. It is going to mean dams, bridges and buildings. It is going to require cement, aggregate, metals and machinery—and it's going to mean men and shovels, cranes, draglines and pullshovels.
Tomorrow's bidding is going to be more competitive bidding. The quality and dependability of equipment is going to play a larger part in the success of contracts than ever before. Then you'll want shovels built for the hardest job a shovel has to do—rockshovels—Northwest shovels!
Now when you are planning for the future watch Northwest performance on the high pressure wartime jobs and plan for a Northwest after the duration.
NORTHWEST ENGINEERING COMPANY
1750 Steger Bldg., 28 E. Jackson Blvd., Chicago, 4, Ill.
NORTHWEST
If it's a real Rock Shovel you won't have to worry about output in dirt

• Contractors H. A. Rogers & Sons use a LeTourneau Model G Carryall scraper and a LeTourneau angledozer at their coal mine near Lebo, Kansas, to remove 14 feet of overburden, four feet of which is blue soapstone.

dicating just what expenditure is planned for airport development, MacDonald said it was hoped to secure federal funds to aid in the work.

"When this program is completed," he said of the entire plan, "transportation by land, sea and air in our commonwealth will move with efficiency unknown in the years that have passed. We will strive to have the most essential things done first because when this postwar program is over, there should be no illusions about large appropriations for many years to come, for it is becoming recognized that the power to tax is also the power to destroy and a halt must be called somewhere."

Noting that the proposed postwar construction was being studied by a special commission of the State Legislature, MacDonald conceded that "the question of financing this huge program is one of some concern."

MacDonald said that his department has been working with the American Association of State-Highway Officials, of which he is a vice president, and the Association of Highway Officials of the North Atlantic States, to sponsor federal legislation to help finance the work, and particularly to change the existing federal aid formulae to give more help to industrial and populated states.

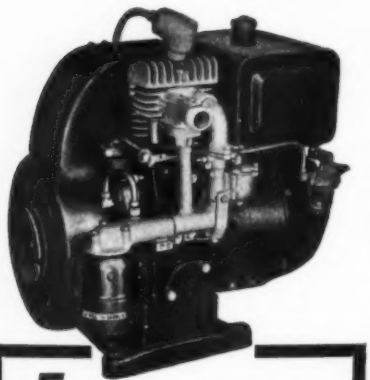
September Portland Cement Production Declines

The decline in production of finished portland cement was continued through September and output of 11,380,000 barrels was 35 percent below September, 1942. Since May, 1943, output has declined in each successive month and the September total was 8 percent below May. Shipments from mills during September, as reported to the Bureau of Mines, United States Department of the Interior, fell 39 percent below those in the same month of 1942. Although the September movement from mills was slightly lower than in August, 1943, the volume remained within the narrow range of fluctuation that has persisted since March, 1943. As September shipments exceeded production, stocks of finished cement declined nearly one million barrels from the end of August to 19,704,000 barrels on September 30. Beginning in April, 1943, stocks have declined in each month except May and the September 30 quantity was 18 percent below that on hand at the end of March. Although this decline was more than seasonal, the end-of-September stocks were not far below customary operating levels for this time of the year.

Another Generator Goes Into Action at Coulee

Keeping abreast of the steadily mounting power demands of Pacific Northwest war industries, the Bureau of Reclamation has put another giant generator at Grand Coulee Dam in Washington into commercial production. The addition brings the installed capacity of the plant to more than 700,000 kilowatts, third largest in the United States and fourth largest in the world.

The present capacity at Grand Coulee is surpassed in the United States only by that of the Boulder Dam power plant, another Bureau of Reclamation development, and by a steam plant serving the New York Metropolitan area. The installation exceeds that of all util-



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★ ONAN GASOLINE DRIVEN ELECTRIC GENERATING PLANTS provide power and light for contracting and engineering projects, for all applications where electricity is not otherwise available, and for emergency service.

They're doing a war winning job on all the fighting fronts.

Sizes from 350 to 35,000 watts. 50 to 800 cycles, 110 to 660 volts, A.C.— 6 to 4000 volts D.C. Also dual A.C. — D.C. output models.

Your inquiry regarding present or post war needs will receive prompt attention.

D. W. ONAN & SONS, 1857 Royalston Ave., Minneapolis, Minn.

Awarded to each of the four Onan manufacturing plants.

ONAN

ELECTRIC PLANTS

SAUERMAN

Power Scapers

Dig and haul any material for few cents per yard.

Operated by one man.

The savings in man-hours that are being made on hundreds of construction and mining jobs by using Sauerman Power Scrapers run into large figures.

Thus this simple, sturdy equipment contributes to the war effort while adding to its long record for conserving labor and power in taking care of varied excavating and stockpiling problems.

Write for Catalog

SAUERMAN BROS., Inc.

574 S. Clinton St. Chicago 7, Ill.

Withdrawn

Baker *Hydraulic* Bulldozer Performance Is Always

Front Page News!

Bakers are "battling" bulldozers judging from the reports coming from the fronts via newspaper and news-reel. The Baker's simple hydraulic system is easy to maintain and operates in any weather or temperature. The direct lift and full down pressure on the blade gets *more* dirt moved *faster*. That's why the Allies can build landing strips, repair bombed roads, and clear blitzed cities of debris with so much speed. Speed that will soon have the Axis hanging on the ropes!

Send for "Unsung Heroes of War" — depicts many wartime jobs — and a copy of Catalog 834-A.

THE BAKER MFG. CO.
"If it concerns Victory, it concerns us"
504 Stanford Ave. Springfield, Ill.

DAILY TRIBUNE:

JUST BEHIND THE DOUGHBOYS ARE THE BULLDOZERS

BY CLAY GOWRAN.
[Chicago Tribune Press Service.]
WITH U. S. INVASION FORCES ON NEW GEORGIA, Aug. 3 [Delayed].—Marking time in a mud drenched bivouac area behind the combat lines on New Georgia is a little group of men whose work will just begin the day the major fighting for Munda point airfield ends. They are the construction experts who, "as soon as we can put in our equipment without having it blown apart," will undertake the tremendous job of making the airfield ready for use of American Working day and

U. S. ENGINEERS BUILD MIRACLE ROAD IN 3 DAYS

WITH THE AMERICAN ARMY IN NORTHERN SIC
Aug. 9 [Delayed]—(AP)—Am
combat engineers helped to
the German defenses at the
gateway to Randazzo by th
miraculous feat of build
mile supply road in three
terrain that would bow
a mountain goat.
"There was no road
footpath—in the area
traverse, and when
the road crossed 13
a number of pe
said Capt. Alex
Keesport, Pa. "
a river bed eve
Cut Ma
It was nec
from near C
o, west of
he town
bute fro
he nort
First
surv
d.
the finished
patrols.
tecting party swe
We put two big bulldoz
one to break a rough road
knocking down trees and pushing
big boulders aside.
"After that we put two lighter
bulldozers out to dress up the road.
Each bulldozer was protected by
armored half-tracks to keep off
enemy planes. Pick and shovel
crews helped out.
"We were ahead of the infantry

CHICAGO DAILY TRIBUNE,
6 ★★★★ Wed., Aug. 18, 1943.

YANKS BUILD AIR FIELD IN 10 DAYS ON NEW GEORGIA

3,000 Ft. Runway Made Out of Plantation.

BY CLAY GOWRAN.
[Chicago Tribune Press Service.]
WITH U. S. ARMY ON REN
DOVA ISLAND, July 11 [Delayed].
—A miracle of military construc
tion has been accomplished in the
muddy sink hole which is Segi plan
tation at the southeastern tip of
New Georgia Island.
Units of the naval construction
battalions landed at Segi on the
dawn of June 30—the day the New
Georgia offensive opened. They
came ashore with bulldozers, power
shovels and trucks in addition to
guns. Yesterday, just 10 days after
landing, they completed the con
struction of a 3,000 foot fighter
plane runway gouged out of an

ARMY E NAVY
Awarded the "E" flag for proficiency in production.

BAKER

The Modern Tractor Equipment Line for
EARTH MOVING
LEVELING AND GRADE BUILDING
SNOW REMOVAL
ROAD MAINTENANCE

• Scenes like this, where this Mack truck is plowing through heavy snow drifts in upper New York state, will soon be enacted in all sections of the northern states.

ities in any one of 30 of the 48 states in the Union.

The Grand Coulee Dam is the key structure of the Columbia Basin project which, in addition to power production, is designed to irrigate 1,200,000 acres of potentially productive land. Construction of irrigation features of the project has been interrupted by the war but studies of settlement and development problems and preparation of designs of the canal and lateral systems are being continued as rapidly as funds and personnel permit. The objective of these activities is to be prepared for early construction of the project either as a war food measure or during the postwar period to provide employment and settlement opportunities for demobilized service men and industrial workers.

On The Inter-American Highway

A large fleet of LINN HAFTRAKS solves the problem of removing rock and rubble.

THE LINN MANUFACTURING CORPORATION
MORRIS, NEW YORK

Remove Restrictions on California Oil Wells

Removal of restrictions on the reworking of oil wells in California, provided the re-working is done in the same pool in which the well is presently producing, was announced by Deputy Petroleum Administrator Ralph K. Davies.

Object of the action, which was taken by amending a formal PAW order, is to obtain maximum return of oil with the steel available for oil production in California.

Plan Construction of New Oil Pipeline

Preparations are now underway to construct an 82½-mile oil pipeline from the Elk Basin and Frannie fields in southern Montana to refineries in Laurel and Billings, Mont., Petroleum Administrator for War Harold L. Ickes announced.

The Tensleep reservoir in the Elk Basin field is the largest oil pool discovered in the United States since 1940. This pool has an estimated reserve of 300,000,000 barrels.

Route of the new pipeline will be as follows: a 6-inch line from Elk Basin field northeastward for 12 miles to a junction point with a 6-inch lateral line 3½ miles long from the Frannie field; thence an 8-inch line northward for 45 miles, at which point the main line feeds into two 6-inch laterals—one going 10 miles to Billings and the other 12 miles to Laurel.

Coal Mining Safety Council Officers

Officers of the Coal Mining Section executive committee of the National Safety Council, elected at the 32nd National Safety Congress, as as follows:

General Chairman—Thomas Moses; Vice-Chairman—J. T. Ryan, Jr.; Secretary—R. H. Nicholas; Labor Representative—Dr. Walter N. Polokov; Mine Operators' Representatives—John E. Jones and Edgar C. Weichel; Mine Inspectors' Representatives — J. J. Forbes and C. L. Lutton; News Letter Editor—E. H. Denny; Engineering Committee Chairman—A. D. Sisk; Entertainment Committee Chairman—J. T. Ryan, Jr.; Film Strip Committee Chairman—Robert M. Medill; Membership Committee Chairman—Cadwallader Evans, Jr.; Poster Committee Chairman—Richard T. McAllister and Program Committee Chairman—J. J. Forbes.

Project Billions in Waterway Developments

Waterway developments costing several billion dollars have been projected and stand ready as an important part of the postwar program, Major General Eugene Reybold, chief of Army Engi-

9 Warehouses for Wartime Wire Rope Service

At the controls, in the gun turrets, at the radio, in the belly full of bombs, the crew of the flying fortress tensely awaits the contact beam of an Aldis light. Away it sends them to destroy the sinister forces threatening the world.

Watching for signals, too, are users of wire rope. For today wire rope must be used to the very limits of safety. Fortunately its factor of safety is great. Particularly is this true of Union Wire Rope into which specialists, outstanding in the industry, have built long years of knowing how. They have engineered into Union Wire Rope maximum strength and greater toughness to withstand harder use and longer service.

Whatever wire rope you may be working overtime, watch it closely. Giving warning signals is one of wire rope's virtues. It is not apt to fail disastrously if its operator is on the alert. First warning is a few broken wires. A rapid increase of additional broken wires marks the approach of the end of your wire rope's safety and usefulness.

To the limit permitted under conditions of war, our 9 strategically located warehouses and Union Wire Rope distributors are striving to maintain the fullest possible wartime wire rope service. Call for the wire rope help you need, including engineering service.

UNION WIRE ROPE CORPORATION
2142 Manchester Ave., KANSAS CITY, MO.

HOUSTON, TEX.
5803 Navigation Blvd.
Phone: Woodcrest 6-4401

CHICAGO, ILL.
One Hundred & Eleven Bldg.
111 N. Canal St.
Phone: Central 3477

ASHLAND, KY.
23rd & Front Sts., Phone: 3123

MONAHANS, TEX.
313 E. Sealy St., Phone: 40

SALT LAKE CITY, UTAH
748 W 8th South St.
(P.O. Box 2196) Phone: 4-7826

PORTLAND, ORE.
2415 NW 22nd Ave.
Phone: Broadway 2103

TULSA, OKLA.
Beacon Bldg., Phone: 3-6277

NEW ORLEANS, LA.
329-333 No. Front St.
Phone: Magnolia 3781

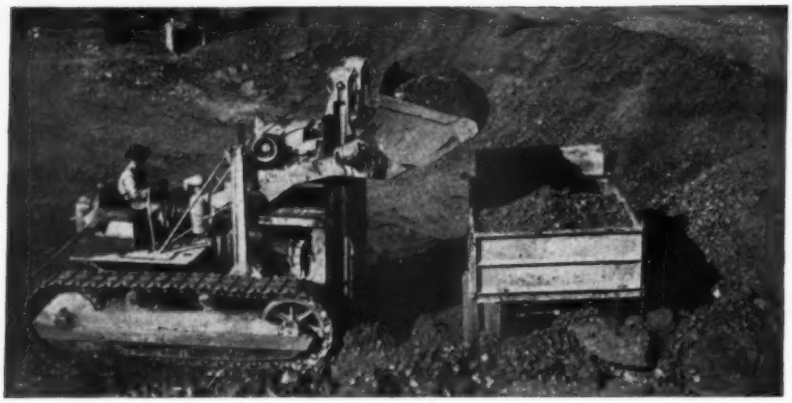
ATLANTA, GA.
880 Glenwood Ave. S.E. Phone: Jackson 4376

union Wire Rope

"THE ULTIMATE LOW COST WIRE ROPE"

SEND FOR ROPE DOPE • Tells how to make wire rope last longer—how to handle and install it—how to socket or splice—and a wealth of other helpful information.

WHEN YOU NEED PREFORMED WIRE ROPE
SPECIFY **union-formed**



• Caterpillar diesel D-7 tractor with Trackson Traxcavator working in a California quarry excavating rock fill to be delivered to an army port of embarkation.

neers, told the Mississippi Valley Association at its 25th annual meeting Oct. 18-19 in St. Louis.

Plans for the Mississippi Basin navigation program alone account for more than $1,000,000,000 and could be quickly expanded to double that amount, he said.

Postwar flood control plans include projects totaling about $2,600,000,000, according to General Reybold, who said authorizations had been given by Congress for nearly 500 flood control projects, exclusive of work on the lower Mississippi River.

Mexican Highways Being Improved

Mexico's highway authorities are carrying on a maintenance program of "excellent character" and are utilizing the present period of abnormally light traffic to improve the roads and save "ultimate road maintenance costs and much inconvenience and expense to traffic," John C. Black, Field Editor of "Roads and Streets" reports following an extensive tour through that country. Mexican bridges and culverts are reported good, grades have been rigidly limited to 6 per cent, but curvatures are generally much sharper than in this country.

Stefan Speaker at Pennsylvania Meeting

Congressman Karl Stefan of Nebraska will be the principal speaker at the "Post-war Planning Conference" and annual banquet of the Associated Pennsylvania Constructors at the Bellevue-Stratford Hotel in Philadelphia, Pa., Thursday, December 9. The conference will open Wednesday, December 8.

Bus Line Air-Minded

Following the lead of some American bus companies, a Canadian highway passenger carrier has applied for permission to operate a helicopter air line after the war as a feeder service.

OBITUARIES

LION GARDINER

Mr. Lion Gardiner, one of the "Old Timers" and vice-president of the American Road Builders' association, died in Columbus, Ohio, November 2, at the age of 59. He was vice-president of The Jaeger Machine Company which is engaged in the production of war materials.

LT. COL. MORRISON

Lt. Colonel Robert F. Morrison, president of the Hastings Pavement Company and a member of the board of directors of The Asphalt Institute, died at his home in Scarsdale, New York, on October 16.

Colonel Morrison, an alumnus of Dartmouth College and of the Massachusetts Institute of Technology, joined the Hastings Pavement Company after his graduation from M.I.T., served as a research engineer, later was made vice-president and in 1937 became president. At the time of his death he was on leave of absence for military duty with the U. S. A. Ordnance Department.

MANGANESE CAST POINTS for SHARPENING Digger Teeth

Quick Economical Repair by Welding. Sharp Teeth Save Power. Immediate Shipment on M. R. O. Priorities.

Send for Bulletin EE 50

ALLIED STEEL MANGO PRODUCTS, INC.

ALLIED STEEL PRODUCTS, Inc.
N.B.C. BLDG. • CLEVELAND 14, OHIO, U.S.A.

HAYWARD BUCKETS

WON'T QUIT OR CAUSE TIME OUT

A Hayward Bucket keeps the job going ahead on scheduled time. It won't quit or cause time out.

THE HAYWARD COMPANY
52-54 Church Street
New York, N. Y.

NEED A BIG Trailer?

La Crosse Makes Them Up To 200 Ton Capacity

WRITE OR WIRE

LA CROSSE TRAILER & EQUIPT. CO.
LA CROSSE, WISCONSIN U.S.A.

NOT in the *Contract*

Girl: "I suppose you find it rather dull in the evening."

Airman: "Simply nothing to do, at all. We play darts, do the cross-word puzzle, drop a few bombs on Berlin, and go straight to bed."

She: "I'm entered in two contests—one for the most beautiful back and the other for the most beautiful bust."

He: "My, aren't you excited?"

She: "I hardly know which way to turn."

"Where are you going, my pretty maid? Why do you pass me by?"

"I'm on my way to gymnathtic thchool," she lithped as she heaved a thigh.

She planted herself firmly in front of him and gritted her teeth.

"Henry," she snapped, "you thought I didn't see you, but I did. You kissed the maid."

He paled. "But, darling, you asked me to try to persuade her to stay another week."

Her attitude changed at once.

"Oh, Henry, tell me quick—did she promise to stay?"

"How are you going to get her back on an allowance," asked the voice in the shack at lunch-time, "after she's been on a payroll at 70 bucks a week?"

Patient: "How are my chances, Doctor?"

Doctor: "Oh, pretty good, but I wouldn't advise you to start reading any continued stories."

"They say his mother was frightened by a clamshell!"

An infantry private beseeched his lieutenant for a three-day leave. Asked for a reason, he explained that his wife had just been made a sergeant in the WACs.

"That's very fine," commented the lieutenant, "but why should that get a three-day leave for you?"

"Lieutenant," the doughboy answered earnestly, "I want to do something that every private has dreamed of doing for the past hundred years."

CHAIN LETTER

Dear Friend:

This chain started in Reno, in the hope of bringing happiness to the tired construction man.

Unlike most chain letters, this does not cost any money, simply send a copy of this letter to five man friends, then bundle up your wife and send her to the fellow whose name heads the list.

When yours works up to the top you will, in turn, receive 15,176 gorgeous girls.

Have FAITH—Don't Break the Chain!

One man broke the chain and he got his WIFE back.

He (sheepishly): "I suppose you're pretty mad at me for coming home with a black eye last night."

She (sweetly): "Angry? Why, no, dear—don't you remember? When you came home last night you didn't have that black eye."

A young lady taking a vocational school course in the operation of a factory machine defined a bolt and nut as follows: "A bolt is a thing like a stick of hard metal, such as iron, with a square lump at one end and a lot of scratching wound around the other end. A nut is similar to a bolt, but just the opposite, being a hole in a little chunk of iron, sawed off short, with wrinkles around the inside of the hole."

Did you hear about the shovel operator with a wife so ugly that he had to always take her with him. He never had courage enough to kiss her goodbye.

New Equipment

(Continued from page 599)

trol, and utilizes common refinery earths available on the open market. The man operating the machine can do so incident to his regular work.

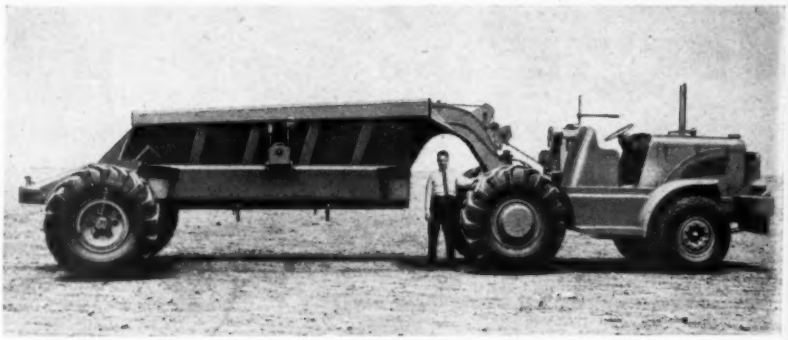
The company also designs the oil reclaimers in seven other sizes. All models are designed to restore used oils to substantially the same values of fire, flash, viscosity, color neutralization number and precipitation number as the new parent oil.

Drum Opening Tools

Manufacturer: Merrill Brothers, Brooklyn, New York.

Claims: Operating on the simple principle of a household can

opener, Merrill Brothers Drum Opening Tool in one quick, easy thrust cuts as it firmly grips the outside of the barrel. It cuts smoothly, evenly, folding cut edges in close to the barrel making drums available for re-use and preventing hand injuries. Made of steel drop forgings, hardened and tempered, it can be resharpened when necessary.



New "Level-Lift" Sling

Manufacturer: Macwhyte Company, Kenosha, Wisconsin.

Claims: A single unit handles 3 tons, a double unit handles 6 tons with a safety factor of 5. This new sling, recently announced after a thorough trial, is called the Macwhyte Caldwell "Level-Lift" type C S E Sling. It consists of a ½-inch wire rope, of any length desired, reeved over a special block with a floating sheave which brakes itself with the weight of the load, but permits the rope to equalize as the lift is started. This patented feature enables the sling to lift unbalanced loads level. Users say it is simple, easy to use, saves time and labor especially in handling long pipes, boxes, steel, and flasks. It is made in one size for handling loads up to 3 tons using one unit, or loads up to 6 tons when used in pairs.

Heil Bottom-Dump Trailer Wagon

Manufacturer: The Heil Co., Milwaukee, Wis.

Claims: The wagon and its heavy duty wheel tractor is 36′ long, weighs 34,000 pounds, and is capable of hauling a 25-ton load. Unlike previous "bottom dump" systems where the dump doors swung down, the new clamshell type bottom dump doors on this wagon swing up alongside the hopper. The doors, operated by a power driver cable, flash open in two seconds and when they are open the vehicle has more clearance than before it dumped. The doors close automatically by gravity and lock when back in position.

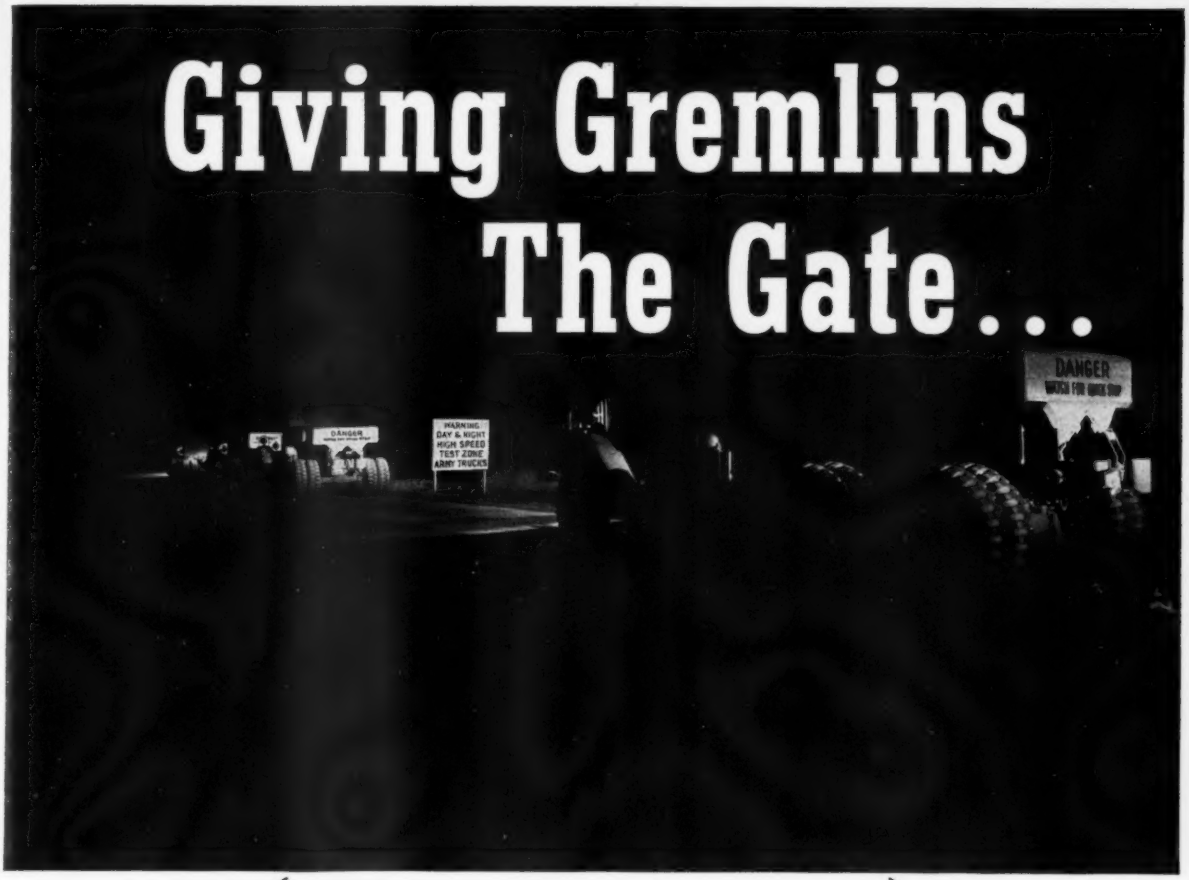
Engine Heater

Manufacturer: York Heat, division of Thos. Shipley, Inc., York, Pa.

Claims: This compact, small preheating unit can be used for: cold weather starting of heavy-duty equipment such as snow scrapers, plows, tractors, shovels, etc. It weighs only 38 pounds and can be carried around by one man like a suitcase. It produces 90,000 B.T.U. of heat per hour and utilizes 92% of all the heat units in the burning gasoline it uses for fuel.

"TAXIES"
for Hell Buggies
ARMY E NAVY
Tanks move doggedly forward wreaking havoc on the enemy but their speed is necessarily slower than trucks and their span of continuous service considerably more limited.
So they crawl up on Rogers Trailers and are moved quickly to the line of combat—or from it when repairs or reconditioning becomes necessary.
Thus, the effectiveness of an important combat unit is increased manifoldly by these non-combat vehicles.
ROGERS
LOW BED-
-HEAVY DUTY
TRAILERS
ROGERS BROTHERS CORP. ALBION, PENNA.

Giving Gremlins The Gate...



Heavy Wreckers (M-1) *made by Ward LaFrance carrying 20,000 lb. loads on routine test run. Road test load exceeds gross weight of finished vehicle.*

● GREMLINS are notorious hitch-hikers... always anxiously awaiting the chance to catch a ride on an indispensable piece of war equipment and foul it up at the most crucial time.

Here at Ward LaFrance we have "open season" on the troublesome creatures... systematically seeking them out and eliminating them long before they can grow up to commit more serious crimes on men and machines. Our successful method of dealing with truck Gremlins is unique with Ward LaFrance.

We take them for a ride!

It's so tough they give up. After a peaceful period of pleasure riding they begin to cry out. They can't understand why a truck has to carry a 20,000 lb. load at full speed... sudden stops and starts... uphill and down. We can tell them.

It's a routine test run given *every* Tank Recovery Truck made by Ward LaFrance. And, if you don't think it gets results... just ask the Gremlins.

When planning your post-war replacements, investigate Ward LaFrance first. Learn about trucks engineered, built and *tested* for specific jobs. You'll be glad you did.

WARD LaFRANCE TRUCK DIVISION

ELMIRA, GREAT AMERICAN INDUSTRIES INC. NEW YORK

© 1943 Great American Industries, Inc., Meriden, Conn.

• The oil sand is loosened by blasting before it is excavated by power shovels.

Oil Sands . . .

(Continued from page 601)

a conveyor belt leading into the separation plant. This method was used right up until the time the plant was taken over by the government this year. It was planned to mine the deposit in benches and the first bench was excavated to about 20 feet at the time the government took over.

Problem of Residue Disposal

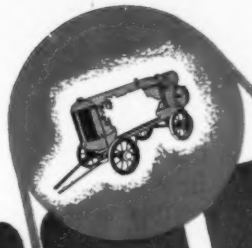
While small scale operations were being carried out, the disposal of the fine, white sand did not present a great problem, but since more than a ton of oil sand must be processed to yield one barrel of oil, it can be seen that residue disposal will become a greater problem if, and when, large scale operations are started.

A ruinous fire at the Abasands plant in the winter of 1941-42 was a severe setback to the important development work being conducted. At that time the plant was beginning to produce crude oil, gasoline and diesel oil. Priorities and material shortages delayed until midsummer of 1942 the rebuilding of the plant. From then until the end of November, 1942, although there was never any continuity of operations, production figures indicate that from 11,156 tons of bituminous sand mined, 10,041 barrels of crude oil were recovered. Some production of asphalt and fuel oil was effected at the plant owned by Oil Sands, Ltd., for the first time in 1938, establishing the fact that the oil sands were a source of heavy distillates as well as oil.

Though winter operation of the Abasand plant and workings has never been attempted, the government project includes the testing of this feasibility. While "far north" the plant is still 700 miles south of the Arctic Circle and is in approximately the same latitude as the Flin Flon (lead and zinc) and the Sherritt-Gordon (copper) mines, in the northern part of the Province of Manitoba, where extensive open-pit mining operations are carried on throughout the year. While governmental plans for the future are highly confidential, the obvious difficulties inherent in removing frozen overburden would cause it to appear at least likely that, if year-round operations are found to be practicable, a suitable quantity of overburden would be removed in the "open" months to permit processing operations to continue throughout the winter.

Many problems remain to be surmounted before large-scale operations can be successfully carried on. But the hungry machines of war are clamoring for more and more oil adding tremendous impetus to the efforts of the skilled men directing and carrying out the project. Also, the northern location of the oil sands which formerly hindered development is, now that the reasonably close

• Top: One of the cabins for married men used in early operation of Abasand Oils, Ltd.
• Bottom: Plant of Abasand Oils, Ltd., destroyed by fire in 1942 and rebuilt the same year. The power plant is on the left and the separation plant on the right with the belt conveyor and loading platform to the extreme right. Part of the refinery is visible between the power and separation plants.



COMPACT

BUDA *Low Pressure* DIESEL

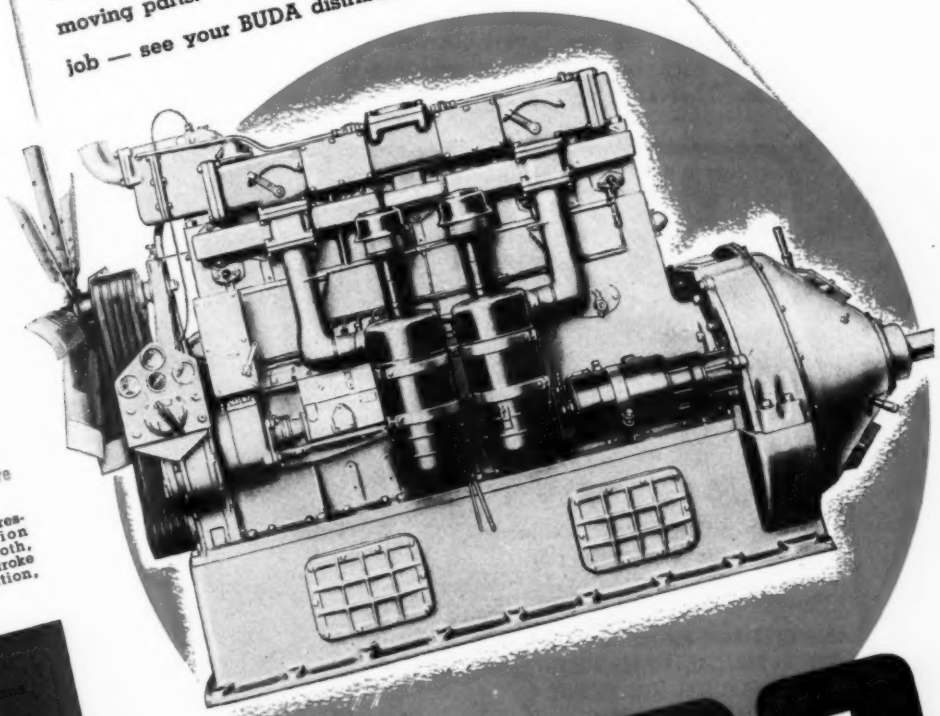
• If you've shied away from Diesels because of their size and weight, take a close look at this trim, compact BUDA. Lower cylinder pressures eliminate the usual Diesel overweight cylinders and head; smooth, prolonged "low pressure" combustion means longer life from smaller, lighter castings and moving parts. There's a trim, compact BUDA from 20 to 340 hp to fit your job — see your BUDA distributor for details!

ORDINARY DIESELS

. . . High cylinder pressures produce sledge-hammer blows that punish pistons, rods and crankshaft every power stroke.

BUDA Low-Pressure DIESELS

Prolonged "low-pressure" combustion delivers a smooth, steady power stroke that cuts vibration, saves parts.



BUDA

HARVEY (Chicago Suburb) ILLINOIS

Alaska Highway has been pushed through, not nearly such a detrimental factor.

The job of the government is described as one of determining whether the extraction of oil and allied products from the oil sands is commercially feasible and can be done economically. At present, wartime censorship prevents mention of governmental plans with regard to eliminating the operating kinks in the project. But this much may be said—the excavating engineer is quite probably going to have a field day up in the northern area of oil-loaded sand.

JOIN THE MARCH OF DIMES
FIGHT INFANTILE PARALYSIS
JANUARY 14-31

Post-war Planning

(Continued from page 595)

work. At the same time we are doing considerable work on access road projects. Therefore, we have not as large a force of engineers on post-war plans as we would like to have.

Our entire Surveys and Plans Department is now engaged in planning for post-war construction. To date we have projects ready to let to contract, the estimated cost of which is approximately $6,000,000. Additional work has been completed to the point where road design plans are available which will increase the above program by approximately $10,000,000. In addition to this, surveys have been completed on work totaling about $22,000,000.

Bridge design and right-of-way acquisition is going forward as fast as is possible with the limited force of men available. Progress in this type of planning has been rather slow because of the shortage of experienced designers, particularly structural designers.

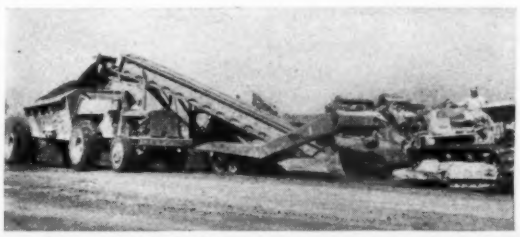
Recently a state-wide Citizens Post-War Construction Council has been organized in Misssouri for the purpose of encouraging planning in cities, counties, and townships. This new organization is becoming quite active and is, as rapidly as possible, contacting all interested public officials to the end that they may have plans prepared for new work as soon as funds become available. It is my understanding that this effort is having a quite definite effect throughout the state and that most public officials are very much interested in cooperating quite fully with this new organization.

(Continued on pages 624 & 625)

WILLIAMS
Buckets
LONGER WEAR,
LESS MAINTENANCE COST
because of WELDED
ROLLED STEEL
CONSTRUCTION
• Williams Welded Design means greater strength and eliminates unprofitable "dead" weight.
MULTIPLE ROPE and POWER ARM TYPES • DRAGLINE • POWER WHEEL • DREDGING • STEEL MILL BUCKETS
⅜ to 16½ yd. capacities
Send for free bulletin covering types of buckets for your particular requirements. It shows details of design and many exclusive features that clearly prove why YOUR NEXT BUCKET SHOULD BE A WILLIAMS.
THE WELLMAN
ENGINEERING COMPANY
7002 Central Avenue • Cleveland, Ohio
ARMY (E) NAVY
BUILT BY
WELLMAN

COORDINATED CONTROL

All Loader operations are controlled by the tractor operator thus coordinating loader and tractor movement. Hydraulic control levers are mounted within convenient reach for instant control of the belt, angle of cutting blade, and the depth of cut for varying conditions.



● This new earth moving tool has a wide range of usefulness and can load practically any material, from loose sand to hard clay and shale, faster and in a shorter travel distance. In almost constant operation for a year and a half, the EUCLID LOADER has definitely proved its superiority over other mobile loading equipment—it is a "post war product" ready for your use on today's important earth moving jobs!

One important feature of the LOADER is its ability to make wide, level cuts and leave a smooth borrow area. The wide cutting blade with a plow point cuts through irregular surface contours and maintains maximum and steady output of material to the carrier belt for faster loading.

Send for your copy of Folder BV-400 which contains illustrations and specifications of this new type of mobile loading unit.

The EUCLID ROAD MACHINERY Co.
CLEVELAND, OHIO

EUCLID SELF-POWERED HAULING EQUIPMENT
For EARTH..ROCK..COAL..ORE
CRAWLER WAGONS • ROTARY SCRAPERS • TAMPING ROLLERS

Left—Now under c
struction is an ex
sion of the four-l
divided highway
U. S. 60 east
Charleston, West V
ginia, including
four-lane bridge cr
ing the tracks of
New York Central c
the Campbell's Cr
railroads. This brid
will replace the n
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foreground. In ad
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alignment, the re
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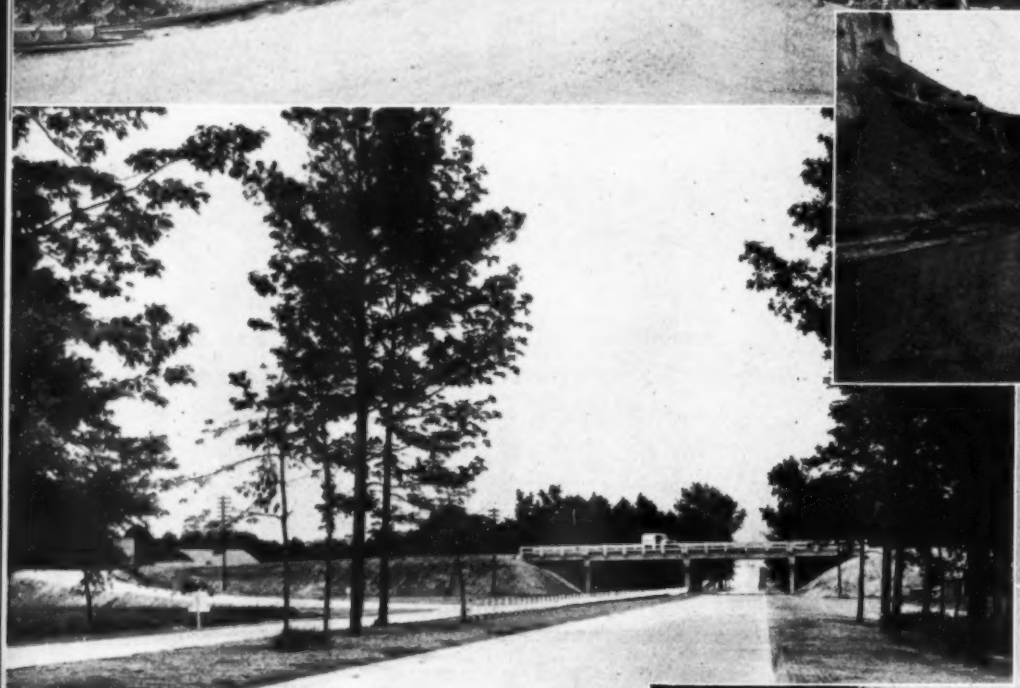
will eliminate a n
row underpass.

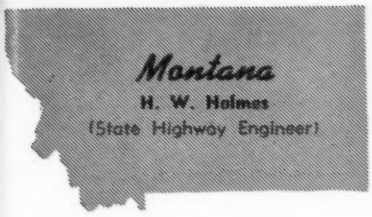


Above — View of U. S
Highway 30 west o
Green River, Wyoming

Above — Grade separation of Routes 13 and 170, south of Norfolk, Virginia.

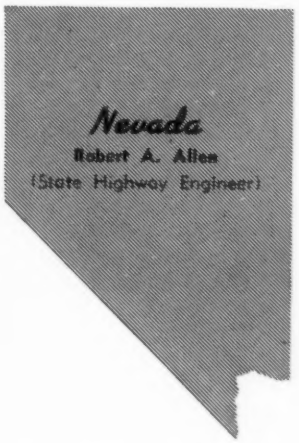
Above — With the rough grad
ing ahead complete, the shovel i
moving up to the next cut o
U. S. 10, near Durand, Wis

Left — Relocation of U. S. 201 in the town of Vassalboro, Maine.



The post-war highway program in Montana will consist of projects such as have constituted our annual construction program of the pre-war years period. The volume of work cannot be intelligently forecast at this time.

The present problem in Montana in regard to post-war planning is procurement of field crews, detailers and draftsmen qualified to render service in connection with pre-construction activity.



After a very careful survey of the entire highway system in Nevada, a program of necessary road improvement was prepared as follows:

Highways — reconstruction and widening 2,719 miles at an estimated cost of $32,722,270 and 302 miles of highways that should be relocated, therefore requiring new construction, at an estimated cost of $3,635,800, or a total of highway work costing $36,358,-070.

Bridges—42 bridges that should be widened or rebuilt at an estimated cost of $1,691,300.

At present the department is making every effort to complete surveys and prepare plans and estimates for as many projects as possible, in order to have the shelf of projects ready for immediate construction when the war is ended. We are rather handicapped in this effort as the military has drawn deeply on the engineering personnel of this department, as it undoubtedly has in all the other states, which forces operation with a very limited personnel consisting in the main of tough old men, a few fathers, and 4-F classifications.

At this wrting we have plans completed for approximately 115 miles of highway—estimated cost, $3,345,000—and hope to be able to increase this by another 100 miles at a cost of nearly $2,000,000 by the end of this calendar year.

In addition to the foregoing and proposed for this year and next, plans are practically completed for the construction of nearly 20 miles of road on the strategic network highway system at an estimated cost of $550,000. Application for certification for this work has been submitted but as yet no action has been taken by the War Production Board. As winter is fast approaching, it is doubtful if this work can be placed under way unless that board signifies its approval within the next couple of weeks.

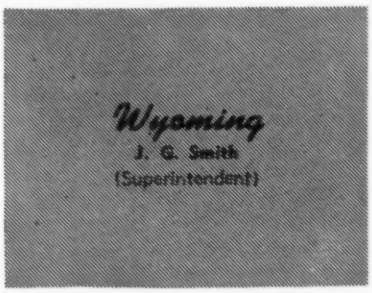
Plans are also being prepared for some access road work, the cost of which will amount to nearly $300,000.

The post-war state highway work in South Dakota will depend on the federal funds which will be available and on how these funds are to be matched by this state.

The State Highway Commission has at the present time prepared plans for 230 miles of new construction and reconstruction on the State Highway System and surveys have been completed and plans are well under way for structures.

In addition to the grading and bridge work, plans will be ready within a short time for 200 miles of bituminous-treated base course and 200 miles of bituminous surfacing, the total estimated cost of this work, including grading and bridges, will be approximately $8,000,000.

In regard to the city, county, and township post-war work, we will say indications are that many of the cities are planning considerable work and the counties will do likewise.



The Wyoming Highway Department has only a small skeleton engineering organization left with the department because of its contribution of many trained engineers to the armed services and various defense industries. However, with what limited personnel is still available, substantial progress is being made on surveys and preparation of plans for post-war construction. At the present time, surveys and plans have been completed on about 100 miles of reconstruction work, amounting to approximately $2,000,000. The completed plans involve grading, drainage, bridges, surfacing and oiling, and other miscellaneous work. These plans have been worked up in detail covering all construction items and specifications and estimates have been prepared. Approximately $2,000,000 worth of work could be put under contract immediately if war restrictions were removed so that federal funds, materials, labor and equipment were available for the work.

In addition to the plans which have been completed during the past year, the department is working on surveys and plans for a post-war building program which will amount to somewhere between 300 and 400 miles of construction work. In this program,

plans amounting to between two and three million dollars worth of work are approximately 75% complete, except for bridges and major structures. These projects are located at various places throughout the state on the heaviest traveled roads and will involve major relocation work in many cases and reconstruction and widening to provide sufficient base and surface courses to handle the heavy traffic which is expected during the post-war period.

The construction work in our proposed post-war program will amount to about $15,000,000 worth of work. The plans, which have already been worked up and those that are contemplated, will provide for the highest type of construction. These highways will be built to an 80-mile an hour alignment standard in the prairie and gently rolling country. It will be necessary, of course, to lower the geometric design standards in the mountains and hilly terrain. These projects will be two lane standard highways with each traffic lane approximately 15 feet in width. The majority will provide for a low type bituminous pavement consisting of an oil treated gravel surface constructed on well compacted crushed gravel base courses of adequate thickness.

If present legislation that is under consideration as provided by Bill HR 2426 is passed in its present form, the Wyoming State Highway Department's construction program will be about two and one-half times the amount stated above. It will also be about two and one-half times the peak construction for any one previous year. We believe that by curtailing all other activities to the minimum, we will be able to match this three-year program with state funds. However, we probably will hit a bottleneck in shortage of engineers and designers to make the necessary surveys, plans and estimates for this amount of work. We are, however, carrying on with what forces we have to get as many projects as possible ready for construction. We will also increase our engineering forces as men become available.

It is believed that a large well-planned program of highway construction is one of the most logical means to provide employment for men now in the armed services and to take up the slack during the post-war period. A large program of highway building will be needed to provide employment and also to rehabilitate highways on which maintenance costs have become excessive from lack of reconstruction work during the war period.

In Wyoming, we intend to have plans and specifications for many miles of highway construction work completed and ready for contract immediately after the war is over and when materials, labor and equipment are available for this type of work. In this way, plenty of highway work will be provided to take care of the men now in the armed services and other defense industries upon their return to normal peace-time life.

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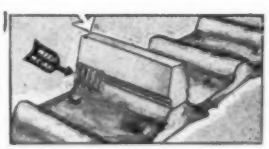
EASILY  WELDED

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• The slurry is burned inside the kiln at a temperature of 2700° F.

Permanente

(Continued from page 592)

by only one other in the world. They are gas-fired. There are three Smidths, 12′ x 463′ and one Traylor 12′ x 450′ rotary units. The slurry is burned at a temperature of 2700° F., the extreme size of the units insuring a very complete burning on the clinker. Another advantage due to the size of these kilns, is that the various components of the clay and the limestone are combined as intimately as possible.

Eliminate Cement Dust Problem

Permanente has just about eliminated the cement dust problem. The gases from the kilns, which in most plants pass off into the atmosphere and settle on the surrounding countryside, are run into the Cottrell dust collection system. Besides having the advantage of eliminating harmful dust, this system represents a definite economy because a good percentage of cement dust is recovered and fed back into the kiln feed. This dust collection system comprises one Western Precipitation Cottrell 6-unit electrical collection system capable of handling 420,000 cubic feet of gas per minute.

The clinker, after having been burned and cooled, is conveyed to the clinker storage building. It is taken as required and fed into the finish grinding circuit. It is handled by belt conveyors. Gypsum is added to the feed into the finish mills. The purpose of gypsum is to serve as a catalyst to control hydration and setting time of concrete.

There are three double unit finish mills, Traylor, Allis-Chalmers, and Smidth. Each consists of a 9½′ x 10′ preliminator mill, an 8′ x 40′ cement mill, closed-circuited with two Raymond Dual Whizzer air separators, 16 feet in diameter. The finish grinding circuit also includes two single unit Smidth Unidan mills, 8′ x 36′, each closed-circuited with 9-foot diameter Smidth cyclone air separators. The air separators provide a means of very closely controlling the fineness of the cement.

After having passed through the finish grinding circuit, the cement is finished and ready for shipment to Uncle Sam's war works. It is taken by screw conveyors, mixed and sampled, and then pumped by Fuller-Kinyon pumps to the cement storage silos. There are 27 silos, 90 feet high by 30 feet in diameter with a capacity of 16,500 barrels each, and 16 star bins, each with a capacity of 4,350 barrels.

Cement may either be dispatched in special bulk trucks or sacked in the company's pack house. The latter includes two Bates automatic four-spout packers with a capacity of 28 sacks per minute each, as well as screw conveying equipment for loading bulk cement trucks.

The story doesn't end here. In addition to these facilities, Permanente operates a bulk loading plant at the port of Redwood City for loading the two permanente bulk carriers, the S. S. Permanente, and the S. S. Philippa. The Redwood city facilities include six silos with a combined capacity of 70,000 barrels, and Fuller-Kinyon pumping equipment. Because of this combination of modern loading equipment and efficient water transportation units, the company has been able to greatly increase shipments to our Pacific bases, and further the war effort.

In addition to the port of Redwood City plant, the company also has a loading and storage plant at Honolulu, including Fuller-Kinyon equipment, sacking equipment, and storage facilities.

Permanente's project manager is D. A. Rhoades and the plant superintendent is J. W. Sharp. The company's activities are supervised by Henry J. Kaiser, with E. E. Trefethen, Jr. as general manager.

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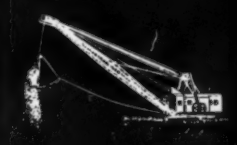
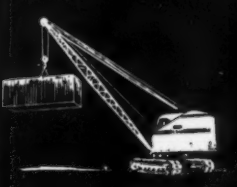
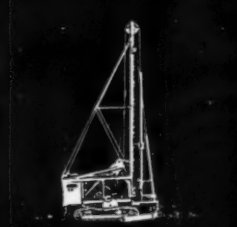
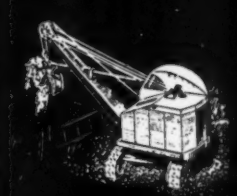

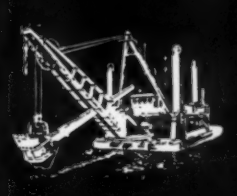
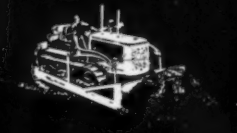

Bucyrus-Erie

GENERAL OFFICES: SOUTH MILWAUKEE WISCONSIN, U. S. A.

Notes from the manufacturers

Westinghouse Electric and Manufacturing Company of East Pittsburgh, Pa., have received renewals of their Army-Navy "E" awards in nine plants. As a result, eight of the plants are now permitted to fly the "E" burgee with two white stars, indicating second renewal of their awards. In addition, the Westinghouse Electric Elevator Company plant at Jersey City, N. J., will fly an "E" burgee with four stars, marking the fourth renewal of its production award.

B. F. Goodrich Company of Akron, Ohio, announces the appointment of H. V. Gaertner, assistant controller of the company since 1929, as assistant treasurer succeeding Edward M. Martin, appointed to overseas service in the international sales division. John H. McGill was appointed assistant controller.

In Stride with the Times

☆ How to make better wire rope . . . How to keep abreast of new developments in wire rope using equipment . . . How to care for and use wire rope properly so that it will last longer—these are problems that have constantly had our consideration ever since the first Leschen Wire Rope was made.

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Brooks Equipment & Mfg. Co. of Knoxville, Tenn., announces the opening of a branch office and warehouse at Knoxville, Tenn. J. Raymond (Red) Johnson is district manager and J. B. Ham is store manager. The company deals in sales and service of construction, industrial, quarry and mining equipment.

A. Leschen & Sons Rope Company, St. Louis, Mo., announces the appointment of R. P. Tyler as general manager of sales and C. R. Deam as assistant manager of sales.

Caterpillar Tractor Co. of Peoria 8, Ill., was recently presented the National Security Award by the United States Office of Civilian Defense in recognition of its Plant Security Program. This presentation was one of the first four made by OCD in this country.

LaPlant-Choate Manufacturing Co., Inc. of Cedar Rapids, Iowa, manufacturers of earthmoving and land clearing equipment, recently became one of the few companies in the heavy equipment industry to have their Army-Navy "E" award renewed for continued excellence in war production.

Gardner-Denver Company of Quincy, Ill., announces the appointment of new personnel of the pump and compressor division. R. H. Rodolf is manager of the pump and compressor division and succeeds the late R. J. MacFarland. C. M. George, who joined the Gardner-Denver division in 1929 was appointed Rodolf's assistant.

The Elwell-Parker Electric Co. of Cleveland, Ohio, is observing its 50th anniversary this year. Company executives point out that 1943 is also a milestone for the entire industry because Elwell-Parker was the first builder of power industrial trucks.

American Manganese Steel Division of the American Brake Shoe Company of Chicago Heights, Ill., announce the appointment of Joseph B. Terbell as first vice-president. He has been connected with the company for 15 years.

Hercules Powder Company of Wilmington, Delaware, reported for the nine months ended September 30, 1943, net earnings of $4,223,270 after estimated Federal taxes of $14,334,607 and a provision of $950,000 for contingencies.

Davey Compressor Company of Kent, Ohio, announces the award of the Army-Navy "E" for outstanding production of war materials. This is the second citation symbolic of leadership on the production front awarded to a Kent industry. Last April the C. L. Gougler Machine Co. received the merit award.

TO ADVERTISE: All advertising in this section is payable in advance. Rate: 60c per line, or $7.20 per inch of 12 lines. Minimum charge $2.40. No discounts; no commissions. If no change in copy is desired, three continuous insertions are offered for the price of two. Read these instructions carefully. Each line contains 41 characters (34 characters if all capital letters are used). Count spaces and punctuation as one character each. Allow 10 characters for box number, if blind advertisement is desired. Count your own copy to save delay. Be sure to enclose the correct amount of money with your order. Closing date—15th of preceding month. Example: January issue closes December 15th.

TO INQUIRE: Be sure to address your inquiry to the advertiser by using the correct box number. Mail your letter in care of Excavating Engineer, South Milwaukee, Wisconsin. Write each advertiser a separate letter. Do not write us for name and address of advertiser. This information will not be given out. We have no information about the equipment advertised other than that shown in the advertisements themselves.

MISCELLANEOUS EQUIPT.

Steam locomotives, 17-20 ton, 36" ga., (4).
Browning 25-ton locomotive crane, steam.
Bucyrus-Erie gas air shovel, GA-2, 1¼-yd.
Bucyrus 50B diesel dragline, 70' bm., 2-yd.
Newhouse 7" reduction crushers, a.c., (2).
Gyratory crushers; 21", 16", and 12".
Pioneer 300W portable gravel washing plant.
Merriman asphalt plant, r.r. type, 30 tons hr.
Hydroelectric plant, 1000 HP, 60' head, A.C.
Euclid 6-yd. bottom dump crawler wagons (8).
Worthington 5'x40' rotary dryer, direct.
United 6'x60' direct heat rotary dryer.
Plymouth 25-ton gas locomotive, std. ga.
2—Hook blocks, single, 20 and 12 ton.
Boiler tubes, 236—1¾"x5'; ferrules; (new).
H. Y. SMITH CO.
828 N. Broadway Milwaukee 2, Wis.

FOR RENT OR SALE
No. 101 Lima Crane, Shovel & Drgline.
Osgood Shovel & Crane.
Marion 1 yd. Shovel & Crane.
6 bag 27E Koehring Paver.
Waller Paving Company, Inc., P. O. Box 46, Salisbury, Maryland. Telephone No. 1166

Wiley Whirley Model 75, 440-volt, 3 phase, 60 cycle; 75' boom; now equipped for dragline operation with 1½ yd. bucket. Rail mounted; 11' gauge. Rated approximately 20 tons at 12'. Located northern Michigan. Box 3002

6—15 yd. cat wagons, bottom dump, 2 compartment. Located near Chicago.
Box 2994

FOR SALE
¾ yard bucket for Type B2 Erie Steam shovel. 1 yard bucket for Type B2 Erie Steam shovel.
Dooley Bros., Inc.
39 George St., Roxbury, Mass.

50-B SHOVEL FRONT
Shovel front end for 50-B steam machine. 26 ft. boom, 17 ft. dipper stick, and 2 yd. dipper. Will sell for $1000 cash f.o.b. mine. Pittsburg, Kansas district. Box 2995

SURPLUS ENGINES

All new—late models. Factory production changes give us these engines to offer for immediate shipment. Suitable for shovels, draglines, cranes, power units, etc. Offered "as is" only.

5—Wisconsin Model ZA2 Gasoline Engine 6 Cyl. 4⅝x5—88 H.P. @ 1400 R.P.M. Idling Speed 504 cu. in. piston displacement.

2—Buda Model L-525 Gasoline Engine 6 Cyl.—4½x5½—82 H.P. @ 1330 R.P.M. Idling Speed 524.7 cu. in. piston displacement.

1—Int. Harvester Model UD-14 Diesel Engine 4 Cyl.—4¾x6½—70 H.P. @ 1265 R.P.M. Idling Speed—460.7 cu. in. piston displacement.

1—Int. Harvester Model UD-18 Diesel Engine 6 Cyl.—4¾x6½—88 H.P. @ 1150 R.P.M. Idling Speed 691.1 cu. in. piston displacement.

4—Waukesha Model WAL Gasoline Engine 6 Cyl. —5¾x6½—148 H.P. @ 1080 R.P.M. Idling Speed—1013 cu. in. piston displacement.

1—Hercules Model WXC-3 Gasoline Engine 6 Cyl.—4¼x4½—75 H.P. @ 1575 R.P.M. Idling Speed 383 cu. in. piston displacement.

2—Wisconsin Model M-4-A Gasoline Engine 6 Cyl.—5¼x6—117 H.P. @ 1230 R.P.M. Idling Speed 779 cu. in. piston displacement.

8—Buda Model 4 DT-226 Diesel Engine 4 Cyl.—3¾x5⅛—37.5 H.P. @ 1410 R.P.M. Idling Speed 226.4 cu. in. piston displacement.

4—Buda Model HP-351 Gasoline Engine 6 Cyl.—4-13/16x5⅛—55 H.P. @ 1490 R.P.M. Idling Speed 351 cu. in. piston displacement.

4—Int. Harvester Model UD-9 Diesel Engine 4 Cyl.—4.4x5.5—49 H.P. @ 1325 Idling Speed 334 cu. in. piston displacement.

4—Int. Harvester Model UD-9 Diesel Engine 4 Cyl.—4.4x5.5—52 H.P. @ 1490 R.P.M. Idling Speed 334 cu. in. piston displacement.

F.O.B. Erie, Pa.

Write for any further information desired and for prices and details concerning additional accessories available for SOME of the above engines.

Bucyrus-Erie Company Parts Department **South Milwaukee Wisconsin**

2 Rex No. 200 Double Pumperete with Waukesha six cylinder Gas Engines. Complete with Pugmill remixers, and 1200 ft. 8" pipe.
12 Wagon Drill Type FM2, Serial X71 W.D. drifters. Pneumatic tires.
4 310 cu. ft. Portable I-R Compressors, Steel Wheels, Gasoline driven.
GREAT LAKES DREDGE AND DOCK COMPANY
122 South Michigan Avenue
Chicago 3, Illinois

FOR SALE
One 4-yard and one 5-yard Hendrix dragline buckets, light weights. Both in good condition. Located Arkansas. Box 3001

UC Allis-Chalmers rubber tired tractor with mechanical bulldozer blade. 220 cu. ft. Air Compressor attachment.
H. E. Hettinger, Contractor
Phone: Reading 3-7737 Sinking Spring, Pa.

5 ton Plymouth 36" gauge locomotive
16 ton Vulcan 36" gauge gas locomotive
40 ton Vulcan saddle tank locomotive
1¼ yd. Lima shovel, crane & dragline
20 ton Brownhoist locomotive crane
No. 1 Vulcan hammer. Std. base
9B2 McKiernan-Terry hammer
MACKINTOSH ENGINEERING CO.
2907 Library Ave., SHadyside 4535
Cleveland 9 Ohio

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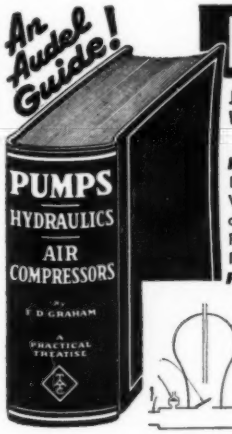

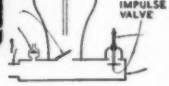

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FOR SALE
International T40 Bulldozer No. TAC 1590, operation condition. $2000.
Howe 20 ton 20' platform Scale, good condition. $300. Box 3003

FOR SALE
One Diesel Caterpillar No. 11 Road Patrol; One A-C tractor model K; One TA-40 Int. Tractor; One 27 E Rex Paver; Baker road-ripper model 2A-171; Asst. of Caterpillar housings and other caterpillar parts; 1 yd. Owen dragline bucket; 2½ yd. Page dragline bucket; One 6 cyl. Waukesha motor; also all kinds of usable A-C, Int. Caterpillar and Cletrac tracks. Sam. P. O. Box 182, East Point, Ga.

FOR SALE
1942 Anthony 3-yd. Hydraulic P.T.O. Dump bed.
E. D. Richardson & Sons Mfg. Co.
Cawker City, Kansas

FOR SALE
1—Shovel Front, complete, for 43-B
1—3 C.Y. Coal Loading Dipper
1—310 C.F. Portable I.R. Compressor
1—G.E. Welding Machine, 300A, V-8 motor.
P. O. Box 338, Brasil, Indiana.

Welding and Cutting Outfits, Torches, Regulators and Gauges, for heavy, medium and light welding and cutting.
Superior Oxy-Acetylene Co., Hamilton, Ohio

Ragland Roller, Farmall tractor with steel front wheels and sheepsfoot tamps built on 30" wide rear wheels. Appropriate fenders and lights and anti-overturn attachment. Machine passes North and South Carolina highway specifications.
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FOR SALE
Front end of Lima Crane, complete, boom, dipper sticks, dipper, drum laggings and cables. Has been but slightly used.
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FOR SALE
18-ton Vulcan Locomotive, 42-inch gauge, in good working condition. Located at Pittsburg, Kansas. Box 2996

FOR SALE
Partial clamshell equipment for 30-B machine consisting of an auxiliary drum unit complete with hand ram and operating levers.
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FOR SALE
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175-B Ward-Leonard electric shovel with 65' boom, 42' handle. Can handle 4 or 5 yard dipper for stripping or 7 yard dipper if used for coal loading. Operated one-third of time loading coal since shipment. Excellent condition. Can be demonstrated. Reasonably priced. Ready for immediate delivery.
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Used model 4160 electric shovel, centrally located. Box 2997

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Experienced operator seeks work in Southern California to be near relatives working in war industries. 13 years experience on shovels of all types of power. Prefers Northwest. Can make own repairs. Also has operated tractors, etc. Age 41 years; married; one child, school age. Selective service 3-A. Box 9215

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Operator with 27 years experience anxious to locate steady job anywhere. Have operated gas, steam, diesel and electric draglines and cranes from one-half to eight yards capacity. Can make own repairs. Age 41. Selective Service Classification—3AH. Can furnish references. Now located in Mississippi. Box 9217

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Twenty years experience on heavy equipment including operation, repair, overhauling and rebuilding of cranes, shovels and draglines, all makes, gas and diesel. Now employed temporarily as Master Mechanic advisor. Age 38; Selective Service classification 3-AH. Interested in permanent position. Located Ohio. Box 9220

CIVIL ENGINEER
Graduate Civil Engineer interested in post-war highway planning. Available for employment. Have supervised field surveys and topographical drafting. Now located Pennsylvania. Box 9218

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Twenty-two years experience in open pit coal mine as fireman, oiler and, for past two years, operator of Bucyrus-Erie 750-B electric. Can furnish references. Age 43; good health. Now located Indiana. Box 9221

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Operator of shovels, draglines and clamshells up to 3 yards capacity wishes steady employment on any type of machine—gas, diesel, or steam—anywhere in U.S.A. Age 38; married; Selective Service classification 3AH. Prefers general excavating, sand and gravel or stock pile work. Now located Wisconsin. Box 9213

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Subject: The most frequently asked questions about forests and forest industries with their answers, tersely stated. Fully illustrated, the 52-page book is sub-divided into chapters covering history, loggers' lore, forest resources, management, and enemies; the harvest, the industries, forest products manufacture, and wood operation. It is thoroughly cross-indexed.

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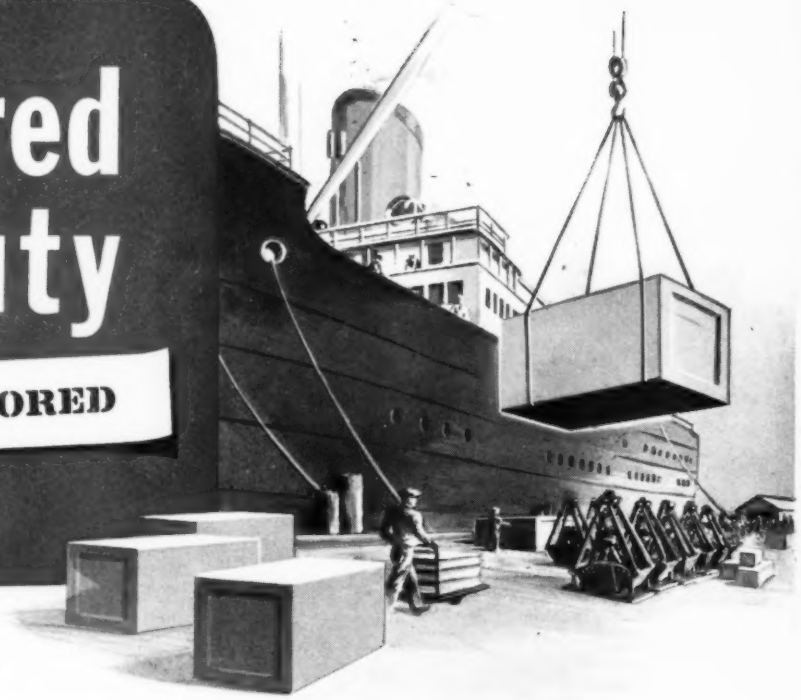

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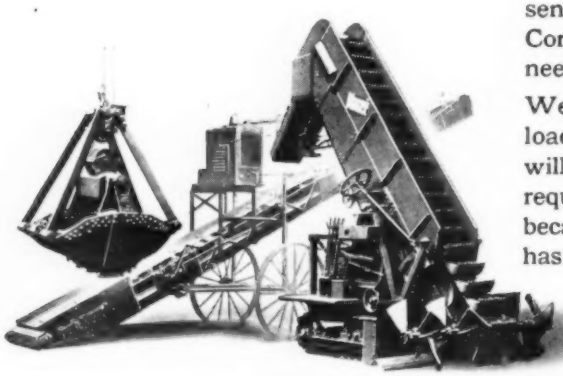

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